AMERICAN ANTIQUITY

Vol. VII JULY, 1941 No. 1

EDITORIALS

OUR NEW OFFICERS. At the Annual Meeting of the Society, Glenn A. Black was elected President, and Emil W. Haury, vice-President. Neither needs any introduction to make him known, for both have served on the Council and Mr. Black is a former vice-President. Both are busily employed: Mr. Black, as Director of Archaeology for the Indiana Historical Society, has a large mound site on his hands, while Dr. Haury has not only Ventana Cave, as reported in Notes and News, but the summer program of the University of Arizona to keep him from mischief. We will hope to hear from them in these pages at a later date.

Meanwhile we wish them every success and pledge them our loyal support.

D. S. B.

DUES ARE DUE on July 1 because our fiscal year begins each year on that date. We used to insert a blue slip inside the front cover of the July issue of AMERICAN ANTIQUITY to remind members of this fact. Many members either did not see this reminder, or they paid no attention to it. So the Secretary-Treasurer had to write them letters and ask for payment. It was often more work to send the letters than it would have been to mail out bills. This year we are leaving out that little blue slip and have mailed letters to you, enclosing your bill. We have done this because we need money if we are to survive, prices are going up, and it costs more to print AMERICAN ANTIQUITY. The journal has been increased to its maximum number of pages, and this increase in size, along with the increase in the cost of paper and printing has cost the Society six hundred dollars more than it had to pay two years ago.

Then there are always some members who decide that they want to drop out of the Society. We can't criticise them for that, but they often forget to tell the Secretary-Treasurer, so they get AMERICAN ANTIQUITY for a year as a free hand-out and don't pay for it. At the time of the Annual Meeting, there were enough back dues outstanding to pay for printing one whole number of the journal with lots of illustrations! Unless we can use every possible means of cutting expenses we may have to consider increasing dues.

This is your Society, and you can help to keep it going if you will pitch in and do your share. If you will pay your dues promptly, we can pay Society bills promptly, and we won't be running up more bills by having to write a couple of times to collect. If you will notify the Secretary-Treasurer promptly of change of address, we will be able to get AMERICAN ANTIQUITY and the NOTEBOOK to you promptly, and we won't have to pay return postage to get them back from your old addresses. If you can't pay your dues by July 1, will you write and tell us when we can expect your dues? This will ensure your being kept in good standing as a member of the Society. If you will send in the names of prospective members, whether individuals or institutions, we would be glad, for we need more members, but we can't get them without your help. If you don't want to continue as a member, just let us know; a penny postcard to the Secretary-Treasurer will do the trick, then we won't have to pay for that copy of AMERICAN ANTIQUITY that you don't want.

If you have any suggestions as to how the Society can be of more service to you or to other members, remember that the officers are elected to do your bidding, and they're always glad to hear from you and receive suggestions and ideas. Write the Editor if you don't like AMERICAN ANTIQUITY, or if you have suggestions for him, and remember that he's always glad to get papers, long or short; if you know that somebody has something that would be a worthwhile contribution get him to send it in.

Our Society can only keep going if we all pull together. Can't we count on you to help?

THORNE DEUEL
Secretary-Treasurer

SOMETHING FOR NOTHING has always been an attractive idea ever since the days when we used to look for hidden faces in puzzle pictures. We felt pretty proud of finding all the faces hidden in those picture puzzles, and thought we had earned the talking machine that was the "prize." When the bill came our parents thought differently, as we found out to our sorrow. Maybe your particular line was selling soap, our soap wouldn't float or lather; it didn't seem very good and we couldn't look our friends' mothers in the eye for days.

In those good old days when people gave things away right and left in order to get customers to come in, our museums started handing out reports on their explorations or on the state of their collections. The interested public got the free prizes for simply showing an interest—institutions had funds in those days, and it was considered only fair

that they should give away reports. And anyway, the recipient of the report always *might* be a future benefactor.

Today, to their sorrow, museums find that they started a habit that is hard to break. People still write in for free literature, but because museums are just getting by on their budgets they have no literature for free distribution. The funds that are used for publications are often revolving funds, which means that earlier issues must be sold before new numbers of a series can be brought out.

Exchange of publications among institutions is a common practice, and by it the publications of all the archaeological museums are circulated. Were it nor for this practice many libraries would be bare of valuable and important monographs. In the same way authors may exchange publications with fellow workers in the field. But in neither case is this something for nothing, because the distributing person or institution gets back in kind what is sent out.

Our fellow-members in the Society for American Archaeology often write us about literature, inquiring where they can get copies of this or that publication, or sometimes asking if the "professionals" are trying to keep "the dope" away from the "amateurs" because Professor Trowel or Dr. Whiskbroom won't send copies of their reports. Many times our inquirer doesn't realize that both Professor Trowel and Dr. Whiskbroom have nothing to say about sending out their reports, and that they may be lucky to get ten or a dozen copies themselves for their friends. They aren't trying to keep publications away from anyone, they're often trying hard to get our old friend John Q. Public to buy, so another number in the series can be brought out.

Occasionally we hear that there is some "conspiracy" to keep knowledge away from the amateurs because Universities and Museums won't send lists of publications that writers may have requested. Failure to answer such requests may be due to a blunder on the part of a clerk, for most institutions will send out their lists of publications at the drop of a hat. Yet there are lots of people who still think it's some sort of a joke to write and get lists of publications from as many places as they can. Occasionally we meet people who collect things like that along with Pullman towels and hotel silver. Maybe these "wise guys" have queered things for the rest of us. We hope there isn't much doubt about the sincerity of most inquiries left in the minds of those who direct the policies of our institutions. The average request for publications is a bona fide order. While we are sure that the public at large recognizes the tremendous expense involved in publishing archaeological literature, there probably are still a number of people who do not. It is only fair to ask in the interest of the genuinely earnest student that he be not

judged by the wise guys and that he be treated courteously. As soon as the general public realizes that there can't be any more free hand-outs and the institutions realize the sincerity of people in search for knowledge, this remaining source of friction will cease to exist.

D. S. B.

CONJECTURES ON THE INDEPENDENT DEVELOPMENT OF THE MOGOLLON CULTURE

JOHN RINALDO

IN RECENT years, questions and arguments about the Mogollon culture have grown hotter. Southwestern archaeologists have split into two camps, one pro- and the other anti-Mogollon. The main argument seems to be whether or not the Mogollon culture was ever a separate entity with a development distinct from the Hohokam and Anasazi cultures, and, if the Mogollon was a separate entity, should it be granted the same independent taxonomic status as the Hohokam and Anasazi?

Much work remains to be done in the Mogollon culture and one can not make too many dogmatic statements. But in this article, I propose to set forth some conjectures which will at least use the available data and which may clarify the situation somewhat.[1]

Much of the discussion about the separateness of the Mogollon has hinged on the problem of dating the earliest known phases of this culture, namely, the San Francisco, the Georgetown, and pre-Georgetown.[2] Those who hold grimly to the idea that the Mogollon culture was never anything but a bastard, peripheral variant of the Anasazi do not wish to admit that the Georgetown and pre-Georgetown phases were at least contemporary with or earlier than the Basketmaker and Modified Basketmaker periods. If they did admit this, then they would also have to admit that the Mogollon culture could be rated as a "basic pattern" or "root."

Unfortunately, at present, the earliest manifestations of the Mogollon (Georgetown and pre-Georgetown phases) have not yet been given absolute dates, mainly because the pit house roof timbers recovered thus far are juniper—a type of wood not easy to date. The most that

[1] The writer is indebted to Dr. Paul S. Martin and Dr. Alexander Spoehr of the Field Museum of Natural History, and Dr. Emil W. Haury of the Arizona State Museum for suggestions and criticisms.

[2] The sequence of Mogollon phases is presented in the following table. This sequence is based on stratigraphy, tree-ring dates, cross-dating, and typology. Dates are approximate only.

Three Circle	A.D. 900–1100
San Francisco	A.D. 700–900
(Some Anasazi traits found here, but these two phases are still predominantly Mogollon.)	
Georgetown	A.D. ? –700
Pre-Georgetown	? – ?

The term Anasazi as here used means the total complex of the Basketmaker-Pueblo culture from earliest to latest times.

can be said with certainty is that we have evidence[3] which proves that the Mogollon culture underwent considerable development *previous* to

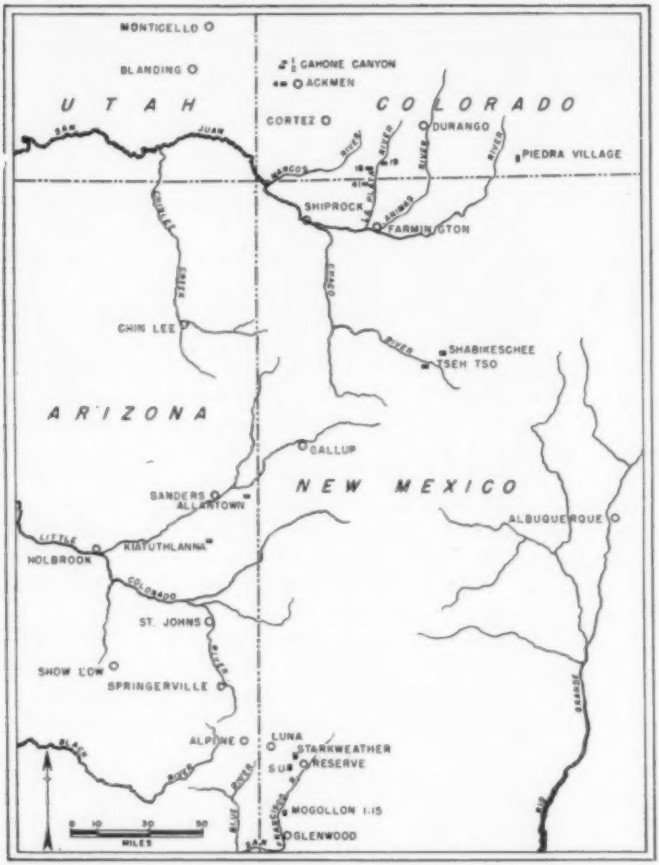

FIG. 1

the San Francisco phase which has been given a terminal date of A.D. 908 by Haury[4] and of A.D. 927 by Nesbitt.[5] This development we feel quite sure was absolutely independent of Anasazi or Hohokam influ-

[3] Martin and Rinaldo, 1940. [4] Haury, 1936. [5] Nesbitt, 1938.

ences. More data supporting this conjecture will be published in the near future (God and wars permitting).

Some archaeologists still confuse the earlier Georgetown and pre-Georgetown phases with the later Mogollon phases (San Francisco, Three Circle) when a tremendous amount of Anasazi influence was modifying the original Mogollon phases and thus producing a "blend." When archaeologists refer to the Anasazi character of the Mogollon, it is to this late "blend" of post-San Francisco times to which they refer. Everyone admits that mixing of Anasazi and Mogollon took place after A.D. 800. What we are interested in showing is that before this mixture took place, say prior to A.D. 700, the Mogollon was a separate entity.

We stated above that no dates exist at present for the Georgetown and pre-Georgetown phases. However, reliable evidence for approximate dating of these early Mogollon phases is at hand.

Wherever absolute chronologies have not been worked out evidence for dating is regularly obtained by "cross dating," i.e. dating sites and culture levels by means of intrusive or trade pieces which have already been given an absolute chronological position in another location. For example, a silver ornament bearing a hall-mark C. A. is found in a mound in Michigan. Research shows that "C. A." was a Montreal silversmith who did most of his work about 1800. Therefore, the level in the mound at which this silver ornament was found is not older than the year 1800. Following this method of dating, we have abundant evidence for stating that Mogollon specimens from the San Francisco and Three Circle phases have been found in Anasazi villages most of which have been dated, by means of tree rings, at A.D. 700 to 950.

Mogollon traits which occur in dated Anasazi villages are as follows:[6]

a. Mogollon smudged pottery types, variants of Woodruff and Forestdale Smudged,[7] have been found at Shabikeschee, Sites 18 and 19 of La Plata, Piedra Village, Whitewater, Kiatuthlanna, and Tseh Tso.

b. Mogollon incised pottery, Alma Scored, at Kiatuthlanna; Alma Punched at Site 41 of La Plata.

c. Mogollon plain brown pottery, Alma Plain, at Site 4, Ackmen-Lowry sites.

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[6] A list of sites with their geographical locations appears at the end of this article. See subject bibliography 1.

[7] To those who insist that the brown pottery with shiny black interior is indigenous Anasazi pottery, we wish to point out that the published data show these smudged wares to constitute too small a percentage on most Anasazi sites to be considered indigenous, and they are not found at all on the majority of Anasazi sites.

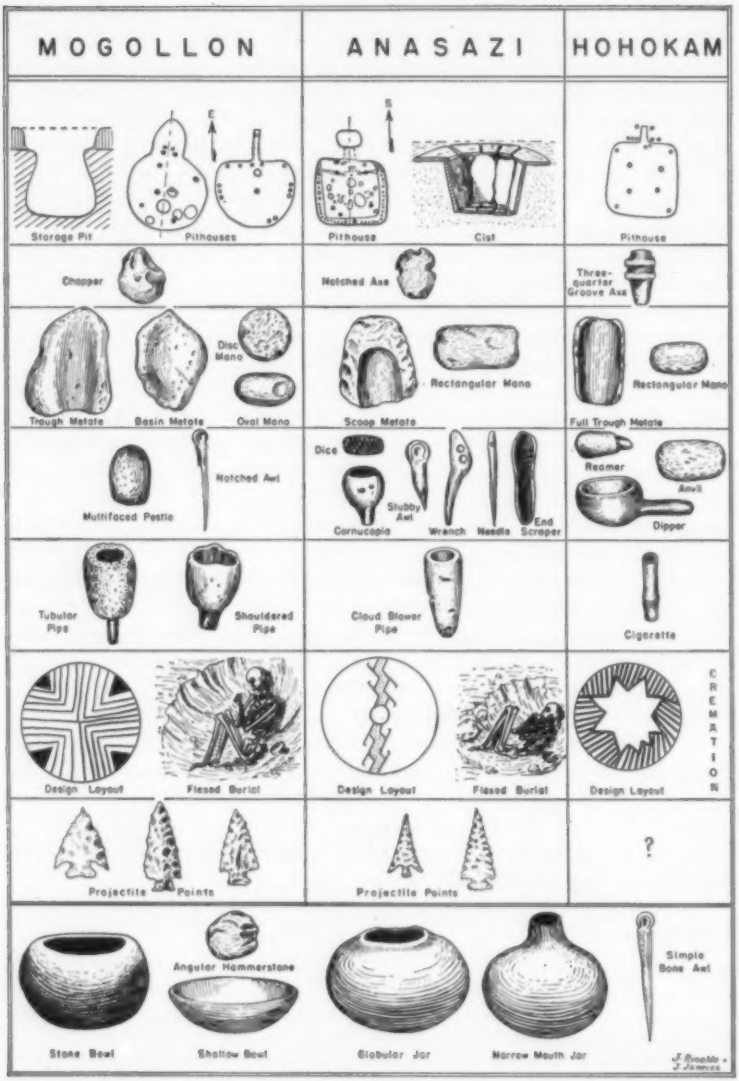

FIG. 2.—Comparison of Southwestern Culture Elements before A.D. 700. Traits held in common, in bottom panel; analogous and distinctive traits, above.

d. Mogollon red pottery, San Francisco Red, at Site 1, Cahone Canyon, and northeastern Arizona.

e. Mogollon type of notched bone awls at Kiatuthlanna and at Site 2, Cahone Canyon.

f. A Mogollon-like entryway (long, lateral and shallow) at one pit house at Site 2, Cahone Canyon.

g. Mogollon type tubular pipes at most of the sites mentioned.

From this evidence, and from much more which could be cited, one may safely state that certain Mogollon traits of the San Francisco phase must have been in existence at least as early as A.D. 700.

As a cross-check on this deduction, we can state that White Mound and Kiatuthlanna black-on-white pottery, Anasazi pottery types dated respectively at about A.D. 700 and A.D. 850, were found by Haury in Mogollon houses which he placed in the San Francisco phase. Reserve Black-on-white, an Anasazi black-on-white pottery type dated at about A.D. 950, appeared first in the Three Circle phase at Starkweather.[8] Thus, we may still fit the San Francisco phase and the initial part of the Three Circle phase in the period A.D. 700–950, by tracing Mogollon traits which moved north into Anasazi strongholds and Anasazi traits which drifted down into Mogollon villages.

But there is even more evidence at hand. We have noted a considerable interchange of culture traits between the Anasazi and Mogollon cultures in the period of A.D. 700–950. During this same period, profound changes in Anasazi pottery and pottery designs may be noted.

For example, we find the Anasazi attempting, with the manufacture of true pottery, to produce a red pottery—possibly in imitation of the Mogollon red wares. First, we find Fugitive Red and another red pottery which is polished and looks like San Francisco Red, but which has a gray core.[9] A little later, we find what appears to be an attempt to imitate Mogollon Red-on-brown in red-on-orange and black-on-red types. Most of this Anasazi pottery is decorated with basketry designs but some specimens show designs which are like the Mogollon both in elements and layout. This imitation of Mogollon design and design layout is more evident in some of the early southern Anasazi black-on-gray and black-on-white types, such as are found at Kiatuthlanna[10] and Allantown;[11] and in Abajo Red-on-orange.[12] Many of these types have the same juxtaposition of solid elements and parallel lines, and some of them have the "all-over" design layout. Also, during the late Modified Basketmaker and early Developmental Pueblo periods in the Anasazi

[8] Nesbitt, 1938. [9] Morris and Shepard, 1939, p. 157.
[10] Roberts, 1931, pl. 18 b and 20 a, b, c. [11] Roberts, 1940, pl. 25 c, d.
[12] Martin and Rinaldo, 1939, fig. 125, left.

we find banded-neck pottery, Kana'a Banded Neck, which parallels or imitates the earlier Mogollon type, Alma Neck Banded, a type which first appears in the Georgetown phase in the Mogollon culture.

Conversely, at a slightly later date, about A.D. 900, we find the Mogollon potters imitating the Anasazi pottery types. During the Three Circle phase of Mogollon we find the Mogollones attempting to make a black-on-white which at first always perversely turned out to be red-on-white, just as the Anasazi at first got red-on-orange instead of what they probably wanted, namely red-on-brown.

Thus, it would seem safe to put an initial date for the San Francisco phase at about A.D. 700. If this be so, Georgetown and pre-Georgetown phases[13] must be earlier than A.D. 700. The argument is further strengthened by the fact that practically no Anasazi materials or culture elements have been found in Georgetown or pre-Georgetown phases.

Of course, some of the arguments about the separateness of Mogollon, Anasazi, and Hohokam depend on definitions. What, one may ask, are the differences between two distinct and separate cultures, such as Mogollon and Anasazi, and what are the differences between a culture and a peripheral variant of it, such as Anasazi and its peripheral variant, Pueblo Grande, in southern Nevada?

In a relatively small area, such as the Southwest, one must expect to find that neighboring cultures had borrowed traits back and forth. This expectation is heightened when one realizes that materials, such as shells from the Pacific Ocean, were traded over great distances.[14] A "pure" culture probably never existed in the Southwest.

Therefore, culture "A" can not be differentiated from culture "B," in a restricted area like the Southwest, solely on the basis of the occurrence of a group of traits in "A" and their complete absence in "B." We must, rather, base our differences on the comparative frequencies of artifact types and their variations in "A" and "B." For example, a certain type of axe is always found in Hohokam sites but rarely in Anasazi sites. This type of axe could then be classed as typical of the Hohokam culture and would help, along with other determinants, to set off Hohokam from Anasazi or Mogollon. Applying this reasoning to the problem at hand, we may judge with a reasonable amount of certainty that the exchange of traits between Mogollon and Anasazi was at a minimum previous to A.D. 700 because the majority of cross finds come from sites dated after 700 and because these cross finds are lacking in earlier sites.

Therefore, if we wish to study and compare Southwestern cultures at a time when there was a minimum of sharing and trading of materials,

[13] Martin and Rinaldo, 1940. [14] See subject bibliography 2.

traits, and ideas, we must make our comparisons with sites and horizons which are earlier than A.D. 700. This means selecting sites which fall in the Modified Basketmaker and Basketmaker periods for the Anasazi; in the Georgetown and pre-Georgetown[15] phases for the Mogollon; and in the Pioneer period for the Hohokam.

In the Modified Basketmaker as it occurs at such sites as Fluteplayer House, Shabikeschee, Site 19 La Plata, and Site 13 Alkali Ridge, we find relatively shallow pit houses[16] with a slab-faced pit bank, an adobe and slab partition wall between the fireplace and entrance, a lateral entryway with a large antechamber, and slab bins in the corners of the main room at the side towards the entryway. The roof was supported by four posts set in the periphery of the room and slightly out from the corners, forming a rectangle. The upper walls had a framework of slanting poles with their bases set in a bench which ran around most of the four sides of the room.

Meanwhile in the contemporary Mogollon pit houses of the Georgetown and pre-Georgetown phases such as were found at Mogollon Village, the Harris Village, and the earlier SU Site, the standard Anasazi pit house features such as antechambers, deflectors, partition walls, and slab lining of the pit were lacking, and other features were quite different. Instead of the standard four primary roof supports forming a square we find anywhere from one to five primary roof supports set out from the walls more towards the center of the room. Instead of the short passage and antechamber type of entryway we find a relatively longer, sloping passageway. Firepits were not well marked like the Anasazi example by slab lining, or adobe coping. The Anasazi pit house had the entryway opening towards the south, the Mogollon pit house, towards the east. The Mogollon pit houses were frequently located so that the excavation had to be made through gravel strata, although there were other possible locations with a sub-soil of loam. The Anasazi frequently excavated their houses through loam and sandy clay.

Another feature of the early Mogollon villages rarely found on Anasazi sites of this period were large, deeply undercut pits located between the houses and sometimes inside of houses. Some were used for storage and burials, others for cooking pits. Parallel Anasazi pits were bowl shaped rather than jar shaped (with the exception of a few Basketmaker examples), frequently had slab linings, and had a large superstructure built above the excavation.

[15] E. B. Sayles has used the name "Cave Creek" in designating a phase preceding the Georgetown phase, on the basis of work done for Gila Pueblo in the Cave Creek drainage in southern Arizona.

[16] See subject bibliography 3.

The Hohokam pit houses of the Pioneer period differed from the early Mogollon pit houses in that they tended to be more rectangular than circular in shape, had shorter entrance passageways, had no uniform orientation, and had several different modes of roof support.

Turning to the differentiation of minor artifact types we find that in the early Mogollon periods there were no hafted axes,[17] but, instead, a plano-convex chopper, a crudely chipped core implement. At this period Anasazi axes were made of thin flattish pebbles, oval in outline, with a notch ground in each edge and in the middle of the poll end. The bit was ground and polished to a sharp edge. In the Hohokam culture a three-quarters grooved axe was made and used at this period, a type which was not made by the Anasazi until later Pueblo times, or by the Mogollon until the culture had coalesced with the Anasazi.

The metates[18] used by the Mogollon in the Georgetown and pre-Georgetown phases were either basin or trough type. The basin type of metate seems to be characteristic of the Mogollon during the earliest phase. It gradually fell into disuse, as the trough type of metate came into use. The most common type of metate during the Modified Basketmaker period was a troughed metate called a scoop type. This has the trough open at one end only and a shelf at the closed end. The trough type metate of the Mogollon also had the trough open at one end only, but it differs from the Anasazi metate in not having the shelf at the closed end and by having more rounded contours. Transitional types between the basin type metate and the trough type metate have the open end of the trough constricted to a marked degree. To my knowledge these are found more often on Mogollon sites than on Anasazi sites. The Hohokam type of metate was a still different type, with the trough open at both ends.

The manos[19] found with the various types of metates correspond in type to the metates on which they were used. The oval and disc shaped manos of the shorter one-hand type are found more frequently in the Mogollon culture, the longer rectangular types, in the Anasazi and Hohokam sites.

It is my impression that stone bowls,[20] mortars and pestles have been found more frequently on Mogollon and Hohokam sites and on southern Anasazi sites than on the more northern Anasazi sites. They appear to be characteristic of the Mogollon culture. The Mogollon used at least three types of pestles, one of which, the multifaced type[21] is rarely found on sites of the other cultures, or has not been reported.

[17] See subject bibliography 4.
[18] See subject bibliography 5.
[19] See subject bibliography 6.
[20] See subject bibliography 7.
[21] See subject bibliography 8.

From Mogollon sites of the early periods, as well as from later sites, come the characteristic notched awl[22] and the carefully finished bone splinters called pins, or skewers. These contrast markedly with the stubby, massive awls characteristic of the Basketmaker and early Developmental Pueblo periods of the Anasazi, and with the awls of the Hohokam. The side-notched bone awls of the Mogollon appear so frequently on all sites that one is led to believe that they were the intentional result of a particular method of manufacture, rather than the remnant of careless work. They appear far less frequently on Anasazi sites, and in very small percentages in large Anasazi collections.

Slender, diagonal notched projectile points[23] were characteristic of the Anasazi culture at this period, although the side-notched atlatl dart point persisted. There is no particular uniformity in type of the Mogollon projectile points of the period, although expanding-stem side-notched points, and short broad-stemmed points with deep diagonal notches, are the types most frequently found. Specimens from the Pioneer period of the Hohokam are so few as to put any generalizations concerning them in the realm of fantasy.

The proportion of pipes[24] of the conical, tubular, or "cloud blower" type made of stone and clay is greater in the Anasazi sites of the Basketmaker and Modified Basketmaker periods than is the proportion of stone tubular pipes with bone tubular stem. The opposite is true of the Mogollon. The "cloud blower" conical pipe is rare on Mogollon sites of the period in question when compared with the number of tubular stone pipes found. Furthermore the Mogollon made a single piece, clay pipe with a pronounced shoulder between the stem and bowl end, which is not found on Anasazi sites. The Hohokam smoked cigarettes.

Just as the long entryway, the side-notched bone awl, and the multi-faced pestle appear to be distinctive, or characteristic traits of the Mogollon, certain traits such as bone wrench, needle, dice, disc pot cover, and cornucopia seem to be distinctive of the Anasazi, and others, such as the long stone rod, pottery anvil, reamer, dipper, cremation, cigarettes, and carving in round are distinctive of the Hohokam.

The Anasazi and the Mogollon cultures shared a few traits in common, such as flexed inhumation, the full-grooved maul and atlatl stones. These traits are not part of the Hohokam culture. In the same way the Basketmaker and Hohokam shared certain traits not part of the Mogollon, such as clay human-effigy figurines and the large two-hand mano. Other traits, such as the simple bone awl, angular hammerstones, single-hand manos, and a few basic pottery shapes, such as shallow bowls,

[22] See subject bibliography 9.
[23] See subject bibliography 10.
[24] See subject bibliography 11.

globular seed jars, and narrow-mouth jars were common to all three.

In general, the color of Mogollon pottery is more like Hohokam than Anasazi pottery, but the Mogollon plain wares are polished, the Hohokam and Anasazi plain types are not. There is also a color difference in the first painted, decorated types, the Hohokam type, being red-on-gray (Estrella), the Mogollon, being red-on-brown (San Lorenzo), and the Anasazi, black-on-gray (Lino).

Further support for classifying the Mogollon as a separate culture is found in the manner of subsistence.[25] It has been pointed out that the scarcity of animal and vegetable food remains and related artifact types indicates that the Mogollones were less dependent on agriculture than the Anasazi. Other evidence points to a similar degree of difference between the Hohokam and the Anasazi.

This comparison of Mogollon and the neighboring cultures of the Anasazi and Hohokam on a horizon previous to the rather arbitrary date of A.D. 700 reveals the fact that a large group of traits are to be found in the culture complexes of Mogollon, Anasazi and Hohokam which differ in type among these groups. That is, many traits, such as axes, were a part of all three cultures but the types of axes used differed among the three cultures: the Mogollones using a chopper, the Hohokam a three-quarters grooved axe, and the Anasazi a side-notched axe. A further differentiation of these cultures was made by a comparison of a group of traits from each culture which are typically present in one of the three cultures and absent, or very rare in the others. For example, a group of such traits as the reamer, anvil and dipper were typical of the Hohokam culture and are rare on Mogollon and Anasazi sites; similarly such traits as the wrench, needle and end scraper were typical of the Anasazi culture and absent or rare on Mogollon and Hohokam sites; and in the same way the deep cooking and storage pit and the multifaced pestle were characteristic of the Mogollon culture and are absent, or rare, in the Anasazi and Hohokam cultures. A third grouping of traits was made: those which were shared by two of the three cultures and not by the third, i.e. by Anasazi and Mogollon and not by Hohokam or by Hohokam and Anasazi a.. not by Mogollon. Finally, there was a large grouping of traits made which consisted of traits such as the angular hammerstone, which is common to all three cultures (Fig. 2).

It seems evident, even with the scanty evidence at hand, that the Mogollon was at one time a separate entity and therefore it should enjoy the same independent taxonomic status as do the Hohokam and the Anasazi. Later (post A.D. 700), Anasazi influences seeped into the

[25] See subject bibliography 12.

Mogollon area and altered the original "brand" considerably. This alteration culminated in later times in the well-known Mimbres Branch of the Anasazi culture.

SUMMARY

1. There has been much controversy among Southwestern archaeologists as to whether the Mogollon culture was ever a separate entity with a development distinct from that of the Anasazi and Hohokam cultures.

2. This article is meant only to be conjectural and to bring more data to bear on the situation in order to clarify it.

3. If it could be shown by the dating of the earliest Mogollon phases, the Georgetown and pre-Georgetown, that the Mogollon culture preceded the Basketmaker, then the Mogollon culture would have to be considered a separate entity because the Basketmaker period is the earliest known period of the Anasazi.

4. The Georgetown and pre-Georgetown phases have not been absolutely dated because roof timbers recovered from pit houses of these periods were not of suitable wood for tree-ring dating.

5. Because there is evidence of considerable development in the Mogollon culture previous to the San Francisco phase and because the earliest known manifestations, the Georgetown and pre-Georgetown phases, are so highly developed, the Mogollon must antedate the Basketmaker unless development was unusually rapid in the Mogollon.

6. Cross dating with pottery and artifact types gives an approximate terminal date for the Georgetown phase of A.D. 700.

7. A trait comparison of southwestern cultures must be on the basis of comparative frequency of artifact types and their variations rather than solely on the basis of presence or absence in the cultures compared. It must be expected that neighboring cultures within a relatively small area like the Southwest borrowed many traits back and forth.

8. This trait comparison should be made in a horizon antedating the period in which the blending of Anasazi and Mogollon took place.

9. This comparison of artifact types and their variations in Anasazi, Mogollon, and Hohokam cultures reveals a sufficiently large group of trait differences in each culture to justify classifying the Mogollon culture as a separate entity.

LOCATIONS OF SITES

SHABIKESCHEE is located on the mesa south of Chaco Canyon, New Mexico, nine miles east of the great pueblo ruins of Pueblo Bonito and Chetro Ketl.

SITES 18 and 19, LA PLATA district, are located in southwestern Colorado. Site 18 is located on a mesa top between Red Horse Gulch on

the north and Maverick Gulch on the south. Site 19 is located east of the La Plata River just south of the road leading from Red Mesa to the mouth of Cherry Creek.

The PIEDRA VILLAGES are located in southern Colorado on Stollsteimer Mesa at the lower end of the Piedra Valley, south of the Durango-Pagosa Springs highway and north of the town of Arboles.

The WHITEWATER, or ALLANTOWN sites are located on the ridge of mesas to the south of the Puerco River of the West, and west of Whitewater Creek, three and one-half miles south of Allantown, in eastern Arizona.

TSEH TSO is located in Chaco Canyon, New Mexico, on a spur which juts northward from the south mesa wall of the canyon. It is on the opposite side of the canyon from Pueblo Bonito.

KIATUTHLANNA is located on the Long H ranch in eastern Arizona forty miles southwest of the pueblo of Zuni and twenty miles north of the town of St. Johns.

SITE 41, LA PLATA district, is on the west side of the La Plata River in northern New Mexico some three and five-tenths kilometers south of the Colorado boundary.

SITE 4 of the ACKMEN-LOWRY district sites is located on the Williford ranch in southwestern Colorado about five miles west of the town of Ackmen, and thirty-five miles north of Cortez.

SITES 1 and 2, CAHONE CANYON, are located in the Ackmen-Lowry district, southwestern Colorado. They are located more specifically: Site 1, on a narrow point on the south rim of Cahone Canyon; and Site 2, on a point between two unnamed canyons which drain directly into Cahone Canyon. These sites are about six miles northwest of old Ackmen Post Office and about thirty-five miles northwest of Cortez.

SU SITE is located about seven miles west of Reserve in west central New Mexico.

STARKWEATHER RUIN is on the W. S. Hudson ranch three and a half miles west of Reserve, in Catron County, west central New Mexico.

MOGOLLON VILLAGE (Mogollon 1:15), is located on a high mesa rising above the east bank of the San Francisco River, ten miles north of Glenwood, Catron County, west central New Mexico.

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THE ORIGIN OF THE SONOYTA TOWNSITE, SONORA, MEXICO

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INTRODUCTION

ARCHAEOLOGICAL investigation in the vicinity of Sonoyta, Sonora, Mexico, an oasis and crossroads settlement on the south bank of the Sonoyta River, a spring-fed desert stream that parallels the Arizona-Sonora boundary for some miles, discloses plentiful evidence of a lengthy and probably continuous occupation of the area by a tool-using agricultural people. The location and general environment of Sonoyta is shown in Fig. *3a*.

During the last thirty years, several tons of polished stone artifacts, mostly metates, manos, and hammers, have been found in the Sonoyta Valley within easy walking distance of the townsite. Many of these, particularly metates and manos, have been salvaged by local Indians, and are still in use.

The first serious studies of these artifacts, almost entirely of the so-called Hohokam type, and mostly of local materials, such as greenstone, were made by Lumholtz[1] whose extensive collection from the Sonoyta Valley is now in the American Museum of Natural History, New York City.

Detailed descriptions of the materials in the Lumholtz collection, and of the sites where they were found, were given the writer by Sr. Alberto Celaya, formerly Comisario of Sonoyta, who assisted Lumholtz in the field. Subsequent inspection of the collections, made possible through the courtesy of Dr. G. C. Vaillant, verified every detail of Sr. Celaya's descriptions, which were given verbally, from memory, more than a quarter century after the finds were made.

Recently, fragments of several human skeletons have been found in adobe pits near the town. These bones, unfossilized and less well preserved than some known to have been buried in 1751, tell little per se, but their stratigraphic location indicates that they are of no great antiquity, and that a dating of pre-1698, the date of the founding of the San Marzelo Sonoitac Mission by Fr. Eusebio Kino, and not pre-Hohokam, is within reason.

Consideration of the probable length of occupation of the townsite, and of the supporting power of the area, shows that the artifact finds are entirely too numerous for their accumulation to be attributed to normal loss. Investigation of possible causes of abnormal loss eliminates ceremonial abandonment, as by burial, immediately, for the distribution

[1] Lumholtz, 1912.

FIG. 3.—*a*, index map showing location, accessibility, and generalized physiographic environment of Sonoyta. *b*, transverse geologic section of the Sonoyta Valley, not to scale. Dotted formational boundaries indicate inferred relations.

The Sonoyta River. *Above:* wall of the river channel, near the Sonoyta ford, showing Sonoyta Formation (largely in shadow), and the Gila Conglomerate, forming the river bed. The horizontal groove in the valley wall, a few feet above the water, was produced by erosion of the basal sand member of the Sonoyta Formation. The ridge in the right distance is an outlier of the Sierra de Sonoyta, here composed of rhyolite flows interbedded with tuffs. Photograph taken during extreme low water in May, 1939. *Below:* Gila Conglomerate in the bed of the river.

of materials through the artifact-bearing stratum is "true random," with depositional structure indicating that the artifacts were deposited at the same time as the surrounding materials. Loss during continued warfare or repeated plagues is regarded as unlikely, for no mention of such occurrences is found in the rather extensive legendary history of the Sonoyta Papagos, which goes back, with some hiatuses, to the time "cuando siendo muchacho El Buen Dios." Remaining, as a possible cause, is periodic obliteration of campsites, a minor catastrophe known to have occurred many times since records have been kept, and of which ample geologic evidence remains from pre-mission days.

When the physiographic development of the Sonoyta townsite, as deduced from field evidence, is compared with the history of the area, as determined from archaeological, legendary and documentary sources, an interesting concordance of evidence is found. Seeming anomalies in one record are plausibly explained by data from the other.

PRELIMINARY ASSUMPTIONS

The water supply of the Sonoyta townsite, prior to very recent (1890) shiftings of the springs resulting from channeling of the valley floor, is assumed to have been sufficient to support not more than 200 people throughout the year. Although minor climatic fluctuations have occurred since man came to this area, as is amply evidenced by the tree-ring chronologies, these have had little apparent effect on the Sonoyta area. There is no geologic or legendary evidence that the springs have ever gone dry, and the size of the arable area suggests that even with unlimited water supply the valley could not support more than 400 persons, under conditions of primitive agriculture.

It is here somewhat arbitrarily assumed that the Hohokam culture, or its substantial equivalent, was brought to the Sonoyta Valley at about the beginning of the Christian era, and that imperishable implements of that general type have been in use there ever since. Those now in use may very well be ancient, as there is no manufacture of metates there today. The arrival of this Hohokam culture in the Sonoyta Valley probably coincided with the postulated southwestward migration of the ancestral Papago.[2]

These preliminary assumptions may be disputed on fairly good grounds, as the Sonoyta townsite is still an "island area," not completely correlated geologically and archaeologically with the better-known areas in the Gila headwaters. It is believed, however, that they are of the right order of magnitude, and that refinements leading to more accurate dat-

[2] Ives, 1936 *a*.

ings and population numbers will not invalidate the conclusions here presented.

PERTINENT GEOLOGY

Although the geology of the central and southern parts of the ancient province of Papaguería is incompletely known, enough of it has been investigated so that brief descriptions of the strata of importance in this study can be given with reasonable hope of correctness.

The Basal Complex. At the bottom of every geologic section in this area is the Basal Complex, composed of schist, gneiss, greenstone, and miscellaneous metamorphics, all probably of pre-Cambrian age; quartzites, not younger than early Paleozoic; and several series of Tertiary intrusives. Greenstones from this complex were extensively worked at La Nariz, and greenstone manos and hammers have been found as far west as Tinaja del Cuervo (*T* in Fig. 3*a*) at the edge of the Pinacate Lavas. Sheets of copper, resulting from secondary deposition, are occasionally found in joints in this complex, and were worked into bells and pendants by the early inhabitants.[3]

Tertiary Volcanics. Resting unconformably on the basal complex, and present also as infaulted wedges, is an extensive series of Tertiary volcanics. Parts of the Sierra de Cubabi, south of Sonoyta, and most of the Sierra de Sonoyta, are composed of these volcanics. Obsidian flows contained in this series were worked as a source of projectile points, knives, and scrapers.

Gila Conglomerate. Exposed in the bed of the Sonoyta River is a caliche-bonded conglomerate of unsorted angular fragments of all older formations. This, except for the caliche bond, exactly resembles modern sheetflood deposit, and is probably of ancient sheetflood origin. Lack of fossils at Sonoyta prevents a rigorous dating of this material, but it is tentatively correlated with the Gila Conglomerate because of its identical stratigraphic position and lithological similarity. A general view of this material, as exposed in the dry bed of the Sonoyta River just north of the town, is shown in Pl. I. Descriptions of the Gila Conglomerate have been published by Ross,[4] Bryan,[5] and others. Paleontological evidence indicates that it is not older than Pliocene. In the Gila, Altar, and Sonoyta Valleys, this formation contains no evidence of ancient man.

Sonoyta Formation. Resting with a slight unconformity atop the Gila Conglomerate is a series of discontinuous beds of conglomeratic

[3] Copper sheet pendants are mentioned by Coronado (Winship 1904, p. 75) and by Sedelmayr (Ives, 1939, p. 115).

[4] Ross. 1923. [5] Bryan. 1922.

material, containing sand lenses and many artifacts. To this, the local name, "Sonoyta Formation," is applied, pending correlation with similar deposits known to exist elsewhere in the Papago country. Recent well diggings in Sonoyta disclose that the maximum thickness of this formation exceeds sixty feet, and that between it and the "hardpan" (Gila Conglomerate) there is a thin layer of fine, water-bearing quartz sand. General relations of the various strata are shown in Fig. 3*b*. The contact between the Sonoyta Formation and the underlying Gila Conglomerate is shown in Pl. I.

PHYSIOGRAPHIC HISTORY

From evidence still remaining, it appears that the earlier physiographic history of the Sonoyta townsite was much like that of the rest of Papaguería, and consisted of alternate marine invasions and intervals of erosion, complicated in Tertiary time by the extrusion of vast amounts of volcanic material. The last major marine invasion occurred in Miocene time, when whale vertebrae were deposited in the yellow sands between Pinacate and Quitovac and literally millions of Turritella shells were left in the sands. Local Papagos recognize the whale vertebrae as "pescado," and the Turritella shells, when in good condition, are used as pendants.

At the close of the major Tertiary volcanism, the entire area was eroded deeply, until relief similar to the present, but slightly greater, was produced. Following this, the Gila Conglomerate was deposited. During the stratigraphic hiatus represented by the unconformity between the Gila Conglomerate and the Sonoyta Formation, the extensive Pinacate Lavas (Fig. 3*a*) were extruded.

Just prior to the coming of man to the Sonoyta Valley, a new depositional cycle, resulting in the Sonoyta Formation, began. The basal layer of this, a fine quartz sand, is of unknown origin, some evidence suggesting that it is an aeolian deposit, while other data indicate fluviatile origin.

Contemporaneously with the coming of man to the Sonoyta valley, the deposition of the major part of the Sonoyta Formation began, and continued with only very minor fluctuations until about fifty years ago.

Recent observations of sheetflood deposition in the Sonoyta Valley[6] and general studies of sheetflood mechanics and deposition,[7] indicate that the entire Sonoyta Formation, above the basal sand, is sheetflood deposit. Discontinuous sand lenses found at various levels in the formation appear due to temporary damming of the channel by these deposits,

[6] Ives, 1936 *b*. [7] Bryan, 1922 and 1925, Davis, 1938; McGee, 1897, and 1901.

which probably caused periodic diversion of the river prior to the cutting of its present channel.

During the last half century, headward cutting of the Sonoyta channel has terminated the "pure sheetflood" deposition, and has made necessary a shifting of the townsite from its former position just east of the ruined San Marzelo Mission to its present location about a mile downstream. This headward erosion has been temporarily stopped by the construction of a diversion dam in the river channel, at about the site of a natural dam of hot spring deposit which washed out in 1890.

LOSS OF ARTIFACTS

When the type of deposition is considered, the number of artifact finds at and near the present and old townsites is no longer unreasonable. The majority of sheetfloods occur during the summer period of torrential rains[8] which takes place in late July or early August. Prior to these rains there is a long-continued drought, which would cause a concentration of population at permanent waterholes and springs, such as Sonoyta. Any sheetflood occurring in such a location would completely overwhelm a primitive camp, burying heavy objects, such as metates and manos, under several to many inches of debris. Under such conditions, the residents would lose most of their material possessions, and at a time when there was a concentration of "wealth" at the townsite.

Until recently, when diversion ditches were dug in strategic locations, and buildings were armored with concrete, the town of Sonoyta was practically wiped out every five or six years by such sheetfloods.

If it is assumed that the peak summer population of the ancient town of Sonoyta was fifty families, and that each lost a metate, mano, or stone hammer once in five years during the twenty or so centuries that the site has been occupied, the amount of artifact material per cubic yard of Sonoyta Formation should be greater than it actually is. As these assumptions seem not only within reason, but conservative, it can be concluded that much of the "lost" material was subsequently salvaged and returned to use, as it is today.

DATINGS

Cultural remains found in the Sonoyta Formation suggest that the deposition began approximately 2000 years ago.

The geologic record indicates that man came to the Sonoyta Valley at the beginning of an interval of arid deposition following a period of erosion, and that no *great* change in conditions has occurred in the area since that time.

[8] Ives, 1936 *b*.

Observations at Sonoyta during the last decade[9] indicate that the maximum deposition rate there does not exceed one foot in thirty years. The maximum thickness of the Sonoyta Formation being in excess of sixty feet, it may be inferred that deposition began more than 1800 years ago. In view of the erratic behavior of sheetfloods, the short period of observation, and the limited knowledge of local climatic details in the past, this figure may be in error by a factor as great as two.

Reference to regional paleoclimatic data, much of it based on the work of Antevs,[10] shows that the peak of the most recent "high water" period occurred about 4000 years ago, and coincided approximately with the "Little Ice Age"[11] in the California Sierras. Comparable glaciations also occurred in the Rocky Mountains,[12] Present evidence suggests that this minor ice age, which was accompanied by increased rainfall in areas not glaciated, began rather suddenly, and that the climatic trend since maximum glaciation has been gradually and irregularly toward increased aridity. The new cycle of channel cutting, which has been in progress for slightly more than a century, and which necessitated the moving of the Sonoyta townsite fifty years ago, is a recent phase of the recovery from this very minor climatic fluctuation.

Bryan[13] has pointed out that under conditions of aridity valley filling occurs during relatively wet periods, and channeling takes place as aridity increases.

From paleoclimatic evidence, a maximum age of not much more than 4000 years can be assigned the oldest part of the Sonoyta Formation.

As the Sonoyta townsite occupies a constricted portion of the valley, in which both surface and subsurface flow are confined laterally and vertically, it is probable that actual deposition there did not begin at the time of maximum runoff, but was delayed until local deposition exceeded the carrying power of the "through flow" from the upper Sonoyta drainage.[14] This would place the commencement of deposition at a time subsequent to the peak high water, and hence less than 4000 years ago.

CONCLUSIONS

Physiographic, paleoclimatic, and archaeologic evidence all indicate that the thick deposit of artifact-bearing sediments, here named the Sonoyta Formation, is of no great antiquity.

Paleoclimatic evidence indicates that the absolute maximum age of the formation is of the order of 4000 years. Consideration of the me-

[9] *Ibid.* [10] Antevs, 1938. [11] Matthes, 1939.
[12] Ives, 1940. [13] Albritton and Bryan, 1939, p. 1472.
[14] This action is similar to that of the Mississippi jetties which, by constricting the channel, prevent silting.

chanics of deposition at Sonoyta suggests that this figure is too large.

Consideration of deposition rates suggests that the oldest part of the formation was laid down more than 1800 years ago. This figure is probably somewhat too small, as it has not been corrected for compaction, solution, or the removal of "fines" by ground water erosion.

Cultural evidence indicates a maximum age of approximately 2000 years for the oldest artifacts contained in the Sonoyta Formation. Verification of this figure awaits the completion of field work in adjacent areas.

The type of deposition plausibly explains the great number of usable stone implements found at and near the townsite, and makes unnecessary the postulation of either unreasonably long occupation of the site, or population in excess of the probable supporting power of the valley. The typical churning action of sheetflood waters also explains the often-encountered condition of broken, machine-made tequila bottles in the same stratum as definitely ancient metates and pottery sherds.

This and other investigations make it very plain that the thickness of an artifact-bearing formation is not necessarily a criterion of the time necessary for its deposition, and that any such depth considerations must be corrected for the type of precipitation, and the local topography. For example: during the last ten years, approximately five inches of rain have fallen on the northwest flank of the Sierra de Cubabi, south of Sonoyta. This rain all fell in a few hours, and deposition from the runoff amounted to about four inches over an area of several square miles.[15] During the same time, some six hundred inches of rain have fallen in the Wanaque Valley, in northern New Jersey. Not more than one half inch of this fell during any twenty-four hour period, and total deposition from the runoff was immeasurably small. Hence, an artifact found one foot below the surface in the Sonoyta Valley might well have been lost only thirty years ago, while one found at the same depth in the Wanaque Valley might be pre-Columbian. Many similar examples can be found.

UNSOLVED PROBLEMS

In addition to the generally recognized need for better methods of dating late Quaternary sediments, several other problems rather directly related to the Sonyta Valley record are still unsolved.

Correlations, both geological and archaeological, between the peripheral areas, such as the Sonoyta Valley, and those more centrally located, such as the Santa Cruz Valley, need strengthening. At present, some areas are practically "worked out," while others, in which the

[15] Ives, 1936 *b*.

evidence necessary for correlations may be found, have been studied in a very superficial fashion, or not at all.

Nothing encountered during this study clarifies the relation, if any exists, between the early Papagos, who migrated southwestward into the Sonoyta Valley, and the Trinchera Builders,[16] who came into the area from the southeast.

The term "Hohokam" appears to need redefinition. According to some workers it refers to a time interval, roughly equivalent to the first half of the Christian era. Others consider it a cultural stage, which may have been reached and abandoned at different times in different environments. In the Sonoyta Valley, it appears that polished stone implements, identical with Hohokam materials from other areas, were in use by local Indians until about thirty years ago, and that a few well-made ancient metates are still in daily use.

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Boulder, Colorado
September, 1940

STONE IMAGES FROM HENDERSON COUNTY, TEXAS[1]

E. H. Sellards

ON NOVEMBER 2, 1929, a stone carved to represent a man's head was found in a gravel pit[2] in the ancient valley of Trinity River in Henderson County, Texas. Subsequently two additional carved stones were found in the same deposits. The deposits were formed by Trinity River, but are about three miles from the present stream, near a small back valley tributary known as Cedar Creek, about five miles west of the town of Malakoff and three miles north of Trinidad. Cedar Creek unites with Trinity River six miles south of the place where the carvings were found. In preliminary notices the discovery has been referred to as the Malakoff locality.[3]

A report on the first image, written in 1929, was submitted for publication in the *American Anthropologist*, but was withheld at the author's request in the belief that more evidence would in time be obtained. The delay was justified by the later recovery of two additional carved stones.[4]

The first image was found in Pit No. 1 (see Fig. 4). The Texas Clay Products Company, through I. Morgado and associates, had contracted for gravel from a pit on Judge Bishop's farm about five miles west of Malakoff. To get the deeper gravel, a hoist was installed and the gravel, which was loaded by hand labor in the pit, was hoisted to the surface. When the pit had been worked at its south side to a clay parting at a depth of about sixteen feet, further downward working was considered undesirable, and the gravel was removed to this clay stratum. However, in order to get better working space, a hole near the hoist was dug somewhat deeper. In making this hole, the workmen encountered a rounded boulder-like rock. After it was turned over and rolled out of the hole, Mr. Morgado observed markings on it which, when cleaned out, were found to be cuts representing the face of a man. The stone was found just before mid-day on Saturday, November 2, and, as work was discontinued at noon, was not removed from the pit until the following

[1] Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration Official Project No. 665–66–3–233.

[2] The writer is greatly indebted to Judge W. R. Bishop who, as the owner of the land, has very kindly given permission for unlimited excavation, and to Mrs. Bishop, who has been actively interested in the preservation of the material. Acknowledgment is also made to Mr. Leo Boatwright on whose property excavations were made. The funds necessary to the extensive work of the past two years have been provided by the Work Projects Administration and The University of Texas. [3] Sellards, 1930; 1940 *a*.

[4] Fossils, not reported on in this paper, were collected from several pits additional to the four described below.

Monday, at which time it was sent with a load of gravel to the Texas Clay Products Company at Malakoff. Here the stone, Image No. 1 (Pl. II*c*), came to the attention of Mr. T. A. Bartlett, manager of the company, who preserved it and subsequently deposited it in the museum of The University of Texas.

Mr. V. C. Doctorman, mining engineer of the Malakoff Fuel Company, saw the stone on November 8 or 9, 1929, and on November 9, after visiting the pit, wrote to the author as follows:

> In a gravel pit about four and a half miles west of Malakoff where some workmen were excavating, was found a roughly carved stone which upon further investigation proved to be shaped very much like the human skull. Diamond shaped openings have been carved to represent the eyes and an attempt has been made to properly represent the ears, nose, and mouth. There is some evidence, also, that the figure was once placed upon the top of a prominence of some kind. This I assume because of a hole, or cavity back of, and underneath the chin. The fossil will probably weigh sixty-five or seventy pounds and is covered with iron oxide which weathers very easily.
>
> As will be seen from the sketch which I will attach, the gravel deposit is about eighteen feet thick and is composed of materials from the size of a teacup to very fine sediment, the different sizes of materials being separated in layers and sometimes cross-bedded.

The writer visited the locality on November 26, 1929. At that time the pit was but little changed from the condition that existed when the stone was found. The depression in which the stone had rested was pointed out by I. Morgado. The pit for several square yards around the spot where the stone lay was excavated to the bottom of the gravel by the writer without, however, any additional relics of man being found.

The stone is a calcareous, more or less ferruginous, sandstone concretion. Such concretions are found weathering from the bed rock at this locality. The concretions in and under the gravel are more or less decayed, some of them to a depth of two or three inches. Decay in these rocks includes removal by solution of the calcareous cement, and oxidation and hydration of the iron, so that the stone becomes crumbly and disintegrates. Like some of the other rocks of this locality, the carved stone disintegrated on exposure to such an extent that its preservation required treatment to re-cement the crumbling sands. The sand that loosened in this way and fell from the stone from December 18 to January 4 amounted to 16.9 grams. The stone was treated with a solution of gum arabic on January 4, 1930, since which time no disintegration is apparent. A thin section of the stone shows it to consist of angular sand grains cemented by calcium carbonate and an iron compound which, in the weathered condition, is a hydrated oxide. When hoisted from the pit, the stone rolled against the truck and as a result of the jar lost a piece from the uncarved side. The break indicates that the stone is affected by

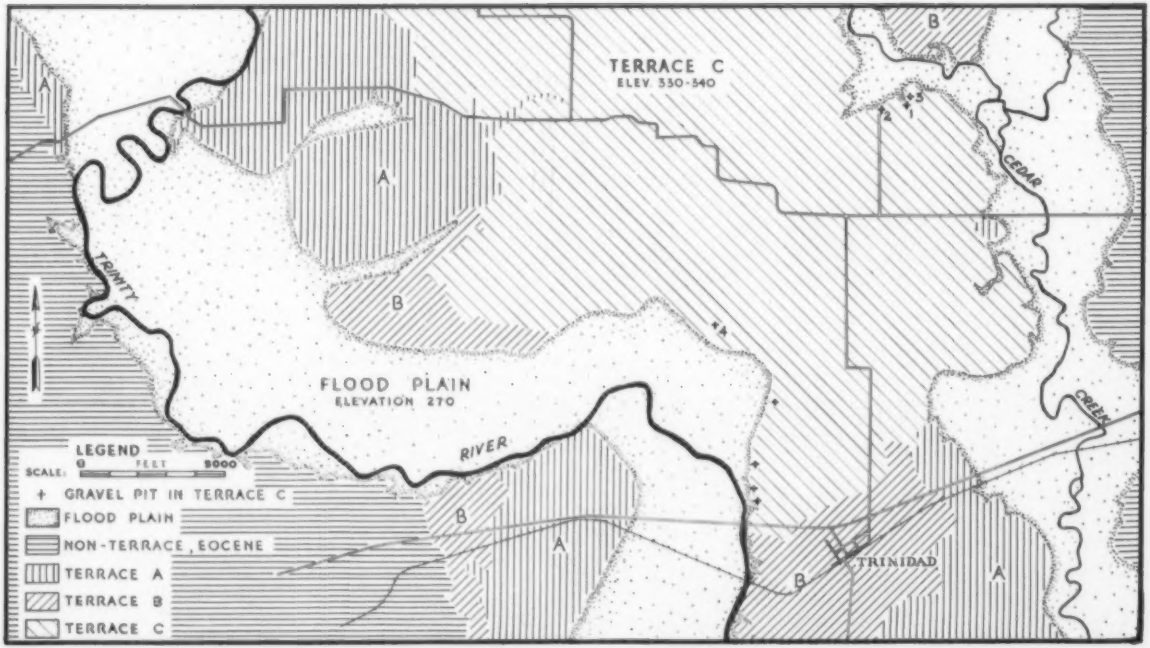
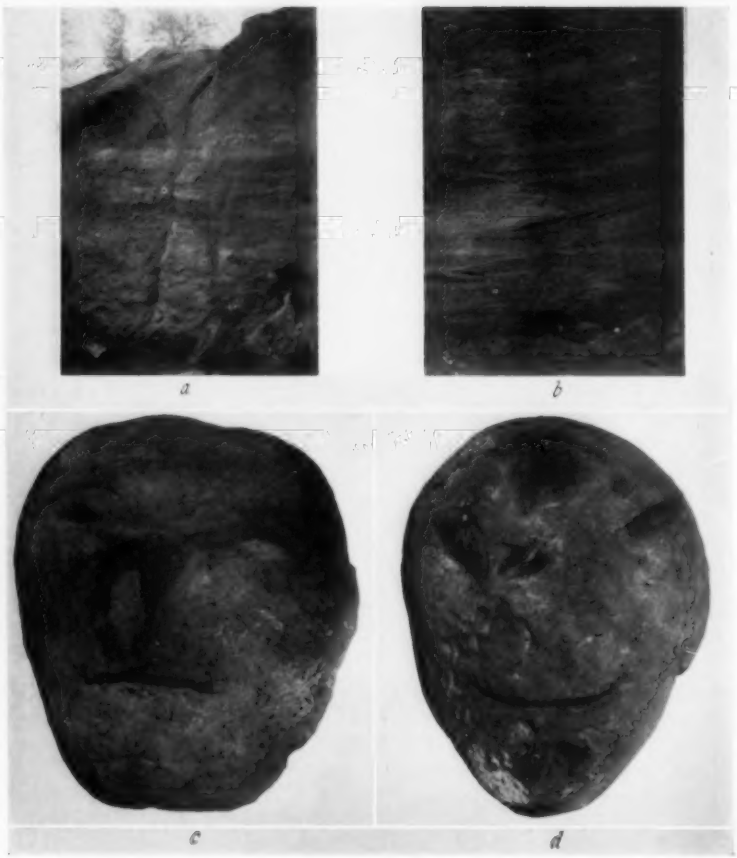


FIG. 4.—Sketch map showing geology of a section of Trinity River, Texas. Pit Nos. 1, 2, 3, and 4



Stone images from Texas. *a*, view in Pit No. 1. *b*, view in Pit No. 2. *c*, image No. 1. *d*, image No. 2.

decay to the depth broken and probably throughout. The stone as now preserved, less the broken piece, weighs ninety-eight and three-eighths pounds.

Image No. 1 lay, as indicated by the depression in the ground, with its longer axis north-south and with the larger end to the south. The larger end rested on bed rock, and under the smaller end were a few inches of coarse gravel. Although the carving was not detected until after the stone had been rolled out of the depression, some of those present thought afterwards that the image lay face downward. For this conclusion there is some support from the stone itself. The face from below the eyes to the chin, especially on the left side, is the least oxidized and best preserved part of the stone. Water found in the lower level of the gravel aids preservation by excluding oxygen and this, assuming that the stone lay face downward, accounts for the better preservation of the face. Some part of the oxidized exterior had been removed from the face in working the stone, but this probably is not the entire cause of its fresher appearance. Clinging to the uncarved side is some clay and gravel of the nature of the clay-gravel parting to which the pit was worked. Also, filling the excavation under the chin, according to Mr. Flagg who removed this filling, was an iron encrusted material apparently, from his description, similar to that of this clay parting. The variation in oxidation observed in the stone finds its best explanation in the assumption that Image No. 1 lay face down, but tilted somewhat to the left side, thus bringing the face, and particularly the left side of the face, nearest to permanent water level. In view of the rate at which the stone oxidizes and crumbles when exposed to the air, it could have been preserved only by lying at or near water level at the bottom of the gravel pit.

The pit in which Image No. 1 was found contains typical stream deposited gravel which varies in size in successive layers. In general, the coarsest gravel is towards the bottom although, as previously noted, near the bottom is a thin gravel and clay layer which has more or less of an iron cemented encrustation. The gravel is, in places, intensely cross-bedded, this being more particularly true in the finer materials. Within three or four feet of the surface the gravel grades into red sandy material of the nature of loamy sub-soil and at the surface to soil. A view in Pit No. 1, taken on November 26, 1929, is shown in Pl. II*a*; the depression from which the image was removed is near the left margin of the picture. The cross-bedding of the sands and gravels is seen in the vertical walls of the pit. The bed rock on which the gravel rests is largely a sandy clay including sandstone rock ledges and calcareous sandstone concretionary boulders.

The stone itself is from the Wilcox formation, Eocene in age. It is

elongate or egg-shaped, being about sixteen inches long and thirteen or fourteen inches in greatest width. That part of Image No. 1 which represents the head, as distinct from the face, has not been excavated or otherwise reduced from the original size of the boulder. On that part which represents the face, from the ears to the chin, a part of the original rock may have been removed, narrowing the boulder downwards, thus more nearly resembling a face. Underneath the chin a roughly circular opening approximately 50 mm. in diameter and 25 to 30 mm. deep has been excavated. The boulder, like some others of the formation, was probably originally egg-shaped. If so, the pointed end has been truncated to make a flat under side to the chin, probably to make the object sit upright more readily. The stone from the eyes backwards differs in color from the face, being ochre-yellow, while the face is more nearly ash-gray with some admixture of yellow. This difference in color represents not a difference in composition of the rock but rather a difference in the degree of oxidation, the gray being the less well oxidized part. When the carving was done, the surface had already been more or less softened by oxidation.

The prominent features of the face—eyes, nose, mouth, and ears—are plainly carved on Image No. 1. The excavation for the right eye is about 53 mm. long by 20 wide by 10 deep. That for the left eye is about 50 mm. long by 25 wide and scarcely as deep as that for the right eye. The eyebrows are represented by lines which, however, are not entirely alike, that of the right eye being more carefully carved. The markings for the left eye are somewhat better preserved and less dulled by oxidation than are those of the right eye. The nose, which is low and broad, is brought out in relief by slight excavation at either side. The excavation for the mouth is 120 mm. from side to side, 35 mm. across at the widest part, and 8 or 10 mm. in depth. The mouth opening is not symmetrical, the right half being larger, deeper, and seemingly more nicely finished than the left half. Teeth are represented at the lower side of the mouth cavity by sloping excavations made, apparently, with a boring implement. Six such bore holes seem to represent lower teeth. Three smaller bore holes may have been intended to represent upper teeth, although the resemblance is less perfect. The ears are carved in relief. The left is the better preserved and projects as much as 8 mm. from the head. As carved, the ear is 70 mm. long by 35 wide. The chin is set off by a lightly excavated line seemingly representing a "double chin." The purpose of this excavation under the chin remains unexplained, unless it were possibly to allow a support to be inserted to hold the head upright. On the left side of the face are several lines which are more or less parallel across the cheeks. In the upper part of the face these lines have lost distinction

through oxidation, but are better preserved on the cheek. Above the left eye is a cut 40 mm. long and 4 or 5 mm. deep. Near it is a circular bore hole 15 or 20 mm. across and about 10 mm. deep. The rock could not have been very firmly cemented when these markings were made, as indicated particularly by the cut. There are no markings on the back of the head.

A second image was found in 1935, in a new pit opened on the Bishop farm about 1000 feet west of Pit No. 1. The new find, which was similar in many respects to that previously obtained, was found by the operator Mr. Joe Gunnels. Pit No. 2 had been opened and some gravel removed in 1933. No additional gravel was taken from the pit until July, 1935. In September, Gunnels cut a trench in the bottom of the pit in order to determine the thickness of the gravel deposit, using a team and scraper to move the sand and gravel. Near the bottom of the gravel deposit, the scraper hit the stone image, scratching off the outer, oxidized surface over an area four by five and a half inches. The scar made by the scraper is on the top of the head and Mr. Gunnels says Image No. 2 was sitting upright. This statement is further supported by the conditions of preservation. A deposit of calcium carbonate is seen on the carving at the right side of the chin (Pl. II*d*). A similar deposit is present on the right side of the face and partly covering the cut surface at the back of the head. Since Image No. 2 lay near ground water level, the fluctuation of which would involve alternate wetting and drying, and since the coating forms on rocks and other objects in the earth subjected to alternate moist and dry conditions, it would appear that the image sat upright, tilted slightly towards the right side. The coating is, also, indisputable evidence that the carving was done previous to the time when the stone was included in the gravel deposit.

The second image is somewhat smaller than the first. Its weight is sixty-three and one-fourth pounds. Like Image No. 1, it is shaped from one of the concretionary boulders found at this locality. This rock, like that of the image first found, tends to disintegrate on exposure to the air and was treated by a solution made by dissolving celluloid in acetone. This treatment was not entirely satisfactory and the rock was subsequently immersed in a solution of gum arabic, which penetrates the pore space, effectively cements the grains, and, by excluding the air, prevents further disintegration. The stone of Image No. 2 is, likewise, somewhat egg-shaped: about fifteen inches long and twelve inches wide. But it had received little remodeling. The mouth is represented by a carved line, there being no attempt to show teeth. The cut for the right eye is approximately 100 mm. long by 25 mm. wide and, for the left, 90 mm. long by 25 mm. wide. Each eye slit is directed obliquely forward and down-

ward. An eyebrow is definitely represented on the left eye, less definitely so on the right eye. Between the eyes is an unexplained deep excavation. The ears are but slightly represented, the left being most prominent. The deepest excavation on the boulder was a notch in the back side of the head which was cut to a depth of about three inches. Because of this notch, the finished object, when viewed from the side, closely resembles a skull. However, it seems more probable that the notch was made so that the stone could lean against some object, thus making a support for the head. It is probable that Image No. 2 when in use was held in position by a band passing entirely around the head and under the chin. This is suggested by a slight trench or depression best seen on the right side.

Excavations in search of additional artifacts and fossils, and to determine geologic conditions, were made in 1938 to 1940. Glen L. Evans was in charge from April to August, 1938, and George Shafer, from May, 1939 to July, 1940. During 1938, special attention was given to the geologic conditions and the age of the gravel deposits, and, during 1939–1940, to the associated fossils.

The third carved stone was found November, 1939, in Pit No. 1 and at the same level as Image No. 1. The depth, however, was greater, twenty-two feet: the pit having been worked in the meantime farther into the hill. The stone is of irregular shape, about twenty inches long, and weighs 135 pounds. It was photographed before being moved from its resting place in the pit. It lay near the base of the deposit, there being only a thin layer of gravel and sand intervening between it and bed rock. The stone is a sandstone boulder, which has more or less disintegrated at the surface. The carving consists of a cut near one end which could have been intended to represent the mouth, back of which are some irregularly placed cuts which may have been intended to define the nose. A deep median cut, back of these, seems to have no meaning unless it is the mouth of another face on the same stone. The right eye of this supposed face is represented by a deep excavation. On the opposite side, a large piece has been broken from the stone so that the left eye, if formerly present, is not preserved. Possibly these deep cuts consisting of eyes and mouth represented a face and, when it was disfigured by a piece breaking from the left side, a second face was made in front of it. So crude are the markings that the second face could represent that of an animal other than man.

On the other hand, all of the carving on this stone may have been made in sharpening instruments. The unexplained cuts and holes on Images No. 1 and No. 2 may possibly be due to the same cause. It would seem possible, indeed, that cuts used in sharpening or polishing instruments may have suggested human features and thus led to fashioning

the boulders into images of human heads. The instruments with which the cuts were made have not been found. If of wood, they probably would not have been preserved. Whatever may have led early man to make these carvings, the conditions of occurrence prove that they were made previous to the time when the stones were imbedded in the accumulating deposits of ancient Trinity River. The disparity in size between the carved stones and the gravel of the deposit indicates that the stones were not carried by stream action. On the other hand, the agreement of the stones in character and degree of weathering with the associated bed rock indicates that they were present on the bed rock and were covered by the gravel, as were the other large rocks under the gravel.

The geology will be described in detail elsewhere, only a brief resume being given at this time. The bed rock at the localities where the images were found is the Wilcox formation of Eocene age. Resting on the bed rock are stream-laid alluvial deposits constituting a system of terraces. During late geologic time the place of union of Cedar Creek and Trinity River has gradually shifted downstream. As a result, terraces are particularly well preserved in the V-shaped area formed by the union of the two streams. Within this area one can recognize, aside from the present-day flood plain, three terrace levels. On the sketch map, Fig. 4, these have been marked in order of age A, B, and C; A being the lowest and youngest terrace above the present flood plain. Soundings made for the bridge foundation at Trinidad show the amount of fill in the flood plain to be about thirty feet.

Terrace A of Trinity River becomes confluent with the terrace of the same level on Cedar Creek about one-half mile south of the railroad station at Trinidad, the southern part of the town being built on this terrace. Remnants of terrace A are found in the valleys of both Cedar Creek and Trinity River. The height above the flood plain, where least affected by erosion or by the accumulation of windblown sand, is about twenty feet. The alluvial fill of this terrace is about thirty-five feet thick.

Terrace B of Trinity River becomes confluent with the same terrace on Cedar Creek at Trinidad, most of the northern part of the town, including the railway and depot, being built on this terrace. The level is twenty-five or thirty feet above the present flood plain level. On Cedar Creek, aside from the Trinidad area, relatively little of this terrace has escaped destruction. The amount of alluvial fill overlying the bed rock is thirty feet or thereabouts.

Terrace C, the oldest and highest of the three terraces, is at a level sixty or seventy feet above the present flood plain. The thickness of alluvial fill where unaffected by erosion is fifty or fifty-five feet. Aside from its position above the flood plain, this terrace is characterized by

abundance of worn Cretaceous shells in the gravel. An examination of the river above and below Henderson County indicates that these three terraces are present in this part of the river, and at places a fourth terrace, D, is preserved.

The base, like the top, rises in each successively older terrace, thus making it possible to identify a terrace by the position of the bed rock quite as well as by the surface level, and indeed, where the surface is destroyed or lowered by erosion, the terrace may still be identified by the position of the bed rock. The bed rock of terrace C, at this locality, as determined by bore holes and outcrops, is about thirty-five feet above the bed rock of the present flood plain, twenty feet above bed rock of terrace A, and ten feet above bed rock of terrace B. This information on the position of bed rock has proved to be of great importance in determining the terrace to which the images and fossils belong since the gravel pits in which they were found are located on the slopes where there is a reduced overburden. The accompanying sections through Pits No. 1 and No. 2 and across Cedar Creek (Fig. 5) show the position of the bed rock under terraces C and B, and under the flood plain. Terrace A is not crossed by the sections.

Evidence on the age of the deposits containing the carved stones is available from associated fossils and from stream development. The list of fossils from the several pits is as follows, the extinct species being indicated by asterisks: Pit No. 1, from which Images No. 1 and No. 3 were obtained, *Parelephas columbi**, *Equus complicatus**, and sloth, indet.; Pit No. 2, from which Image No. 2 was obtained, *Parelephas columbi**, *Equus complicatus**, and *Megalonyx** sp.; Pit No. 3, near Pit. No. 1, *Tapirus** sp.; Pit No. 4, on the Boatwright farm in terrace C: *Parelephas columbi**, *Mastodon** sp., *Equus complicatus**, *Camelops** sp., *Tanupolama** sp., *Bison** sp., *Odocoileus virginianus*, *Platygonus** sp., *Castor** sp., *Canis* sp., *Holmesina** sp., *Megalonyx brachycephalus**, *Didelphis* sp., rodent, genus indet., *Testudo** sp., bird, indet. A similar fauna has been obtained from several other pits in terrace C.

The stream development recorded in the terraces A, B, and C, already described, likewise affords important information on age. In Bee County, Texas, an extensive fauna has been obtained from a terrace of the Mission River drainage basin, the Berclair terrace, which has been proven to be the upstream equivalent of the Beaumont formation.[5] The fauna of terrace C of Henderson County thus far obtained includes a smaller percentage of recent species than does that of Berclair terrace. This percentage may be modified by subsequent collecting, and in any

[5] Sellards, 1940 *c*.

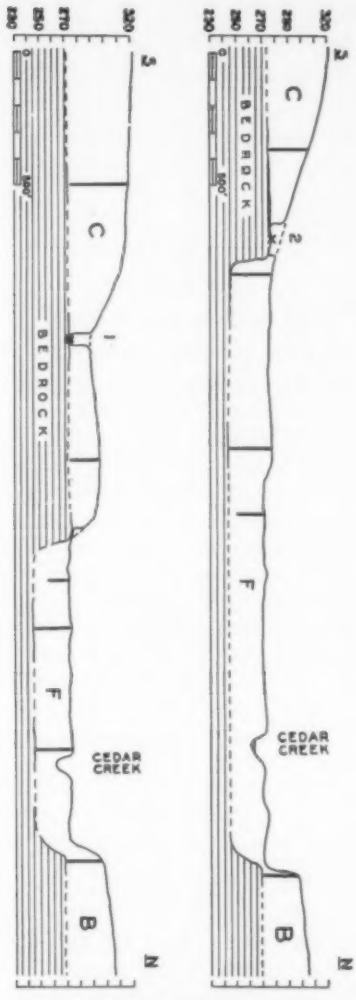


FIG. 5.—Cross sections of Cedar Creek showing positions of Pits Nos. 1 and 2. F: flood plain; B and C: terraces.

case it should not be concluded on this evidence alone that terrace C of Trinity River is older than Berclair terrace of Mission River. A final determination of relative age of the two terraces must await downstream tracing of terrace C to determine its equivalency in the Coastal Plain Pleistocene formations.

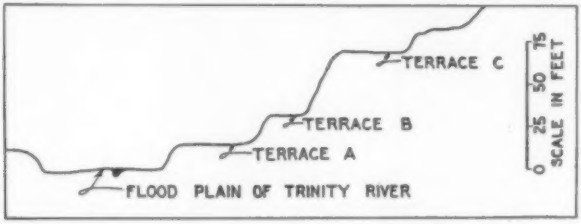


FIG. 6.—Graphic representation of terraces of Trinity River, Texas.

In the accompanying illustration (Fig. 6) is given a graphic representation of the lowering of the river valley and the formation of successive terraces. At each of the stages indicated, the river formed a broad valley. In the formation of each valley, the river not only cut downward to grade but widened the river valley by lateral planation. The width of the present flood plain varies from somewhat less than one mile to about two miles. The width of the older and higher flood plain valley, of which only remnants remain, were evidently as great or greater than the present flood plain. The fill in the valleys varies from about thirty to sixty feet. The length of time in years required to carve and fill a valley of this size is not known. The oldest of the valleys, the one containing the images, was formed, in the writer's opinion, much before the close of the Pleistocene period.

The geologic age of the images is Pleistocene. The age in years is that represented by the lowering of the flood plain of the river sixty or seventy feet through three successive stages during each of which a broad river valley was formed.

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The University of Texas
Austin, Texas
October, 1940

A SULA-ULÚA POTTERY KILN

DORIS STONE and CONCHITA TURNBULL

ON THE western end of the north coast of Honduras, the outstanding river is the Ulúa, whose basin is formed by the plain of Sula. In the south, the gradually descending steps of the Cordilleras with the open avenues of the Ulúa on the west and her tributaries, the Lindo due south and the Comayagua at the east, bring contact to the wet valley of Sula from the semi-arid interior. Eastward lies the low margin of coast and the lagoons and river systems of the Pijol range. West and southwest is mountain land with an important river valley, the Chamelicon, which merges into the Sula plain. At the north is the open sea, bringing to this region varied influences from many and distant places.[1]

All of this area was inhabited in Conquest times by various Indian nations, some of whom, for example the Mexicans, were definitely of North American origin; while the direct linguistic relationship of others, like the Paya,[2] is still unsettled. Archaeologically, however, artifacts found in country which is historically Paya appear to be affiliated with cultures as far distant as those found in the northern part of Ecuador in South America,[3] and in certain portions of Santo Domingo[4] and Haiti.[5]

The people who fringed the Sula plain in the south, that is in Comayagua and Lake Yojóa, were the Lenca,[6] while also in the same region, and including the country toward the west, were the Maya.[7] On the eastern side, the immediate neighbors were the Jicaque,[8] while beyond, but still in close contact, were the Paya.[9] Besides this conglomeration of actual neighbors, there were the Nahua-speaking people who came, settled, and acted even as itinerant traders.[10]

It is not surprising then to find the valley of Sula-Ulúa to be archaeologically a mixed region—a meeting-ground of divers peoples who pushed into this area literally from the four cardinal points. Sufficient knowledge is not yet available to identify exactly the original inhabitants of the Sula valley. Nor is it within the scope of this paper to delve too deeply into the various composites of Sula-Ulúa culture. Here we are

[1] The importance of the Caribbean Sea at the time of the advent of the Spaniards can be gathered from the following sources: Columbus, 1732, p. 605; Las Casas, 1875, t. III, lib. 2, cap. XX, p. 109; Diaz del Castillo, 1904, t. II, p. 306.

[2] Lehmann, 1920, b. 1, pp. 66–67, indicates a South American relationship for Paya speech. Edward Sapir holds the Paya to be of Penutian stock. See: Encyclopedia Britannica, 1929, vol. 5, pp. 138–141; Mason, 1940, p. 74, lists the Paya as "unclassified"; Johnson, 1940, p. 113, calls them "unaffiliated." [3] Stone, 1941. [4] *Ibid.* [5] *Ibid.*

[6] Stone, 1940 *b*, p. 387. [7] Stone, 1940 *b*, pp. 386, 387.

[8] Angufano, 1908, p. 392. [9] Stone, 1940 *a*, p. 67; 1940 *b*, p. 389.

[10] Stone,1940 *a*, p. 67; 1940 *b*, p. 394.

concerned primarily with the Maya, who belong to the last period of pre-Columbian inhabitants.

This does not mean to say that at the time of the Conquest only the Maya were in the Sula-Ulúa. Archaeological evidence shows a highly complex combination. Historically we have the report of Peter Martyr,[11] which definitely applies the name "Maia" to this section of the coast. The probanza of 1533 concerning the area of the Rio de Ulúa, Salamanca de Campeche[12] shows that the Maya made this region an easternmost province, and were responsible for many of these Ulúa settlements. So far, however, no record has appeared which designates any particular mixture of cultures. Even such simple subjects as site-names have not survived in the majority of cases. We are forced to depend, then, almost completely upon archaeology in our reconstruction of the Sula-Ulúa, and to use modern names for our archaeological sites.

Because of this, we do not know whether or not the original Indian town where La Lima now is located was wholly or only partially Maya. That there were Maya amongst the aboriginal population is evident from the artifacts unearthed in this section. Perhaps the most important of these, in view of our present knowledge, is the pottery-kiln found in a mound in what is now a cow-pasture of the United Fruit Company. This is situated northeast of the La Lima station; in fact, directly opposite the eastern portion of a large sugar mill. Here are a group of mounds, with one particularly lengthy in extension. These probably were living-mounds, built to support the village from the yearly flood. Almost anywhere one digs in this group one encounters at least a few fragments of pottery such as would be expected at town-sites.

Maya pottery, even Ulúa-Maya, is numerous. A Maya pottery-kiln, however, is very rare. Of course, there may be many reasons for this, chief of which we probably should place "luck." This is especially true when we consider the fragility of a kiln. A kiln is built on the surface, not inside the earth, and whatever dirt is to be found inside and over the kiln is there as a result of natural and not human forces.

The kiln itself, four feet below the present surface of the mound proper (Pl. III *a*), has clay walls four and a half inches thick, and measures forty-eight inches in height from the base to the top, following a cone shape. The circumference at the base is sixteen feet ten inches.

Inside, the floor of the kiln was covered with sixteen stones, on top of which was a layer of ash three to four inches deep. About ten inches from the base is a small hole about the size to permit the entrance of branches such as would have been used for kindling and fuel.

[11] Martyr, 1516, Dec. III, lib. IV.

[12] Probanza concerning the area of the Rio de Ulúa: Salamanca de Campeche, June 8, 1533; Lothrop, 1927; Stone, 1940 *b*.

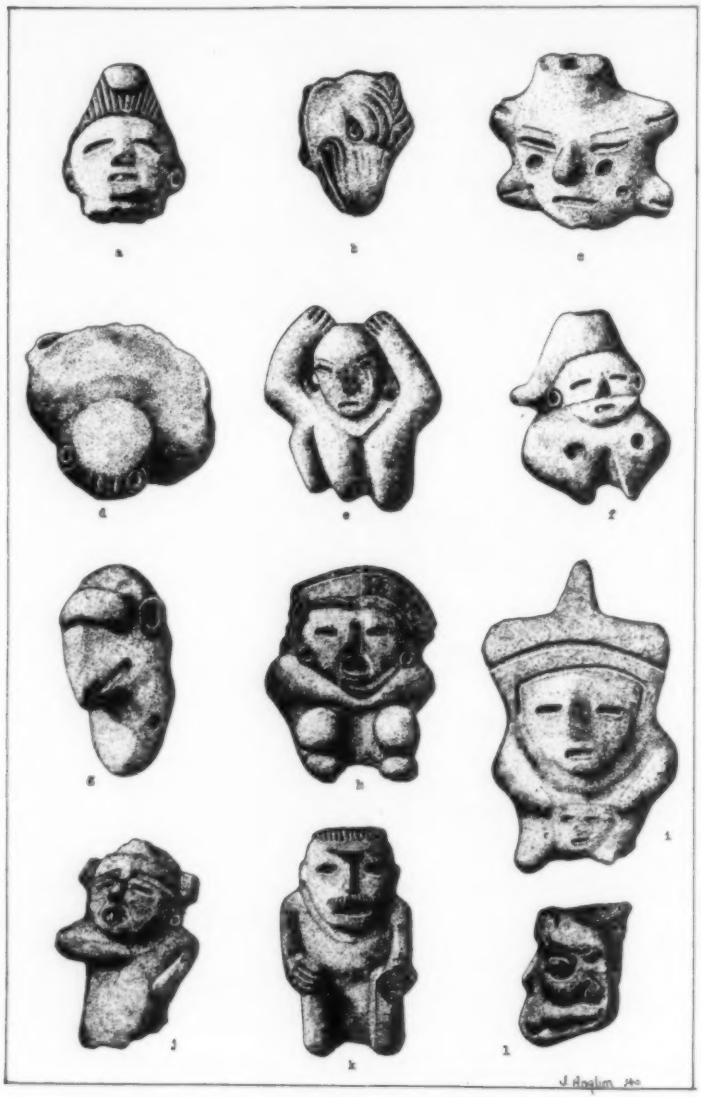
a. Sula-Ulúa pottery kiln, Honduras. *b*, clay animal figurine head, mold-made, *c* and *d*, dark red ware with faint, light red-orange patterns.

Monochrome sherds, Sula-Ulúa pottery kiln, Honduras.

a–d, Lenca polychrome sherds, possibly with Maya influence. *e*, polychrome sherd showing "outside" or non-Sula-Ulúa influences. *f*, red-on-light-orange ware with pattern common both to Lenca and Ulúa-Maya. *g*, typical Ulúa-Maya sherd. *h*, Ulúa-Maya shallow tripod sherd, Honduras.

Polychrome Maya-type sherds, typically Ulúa-Maya. Honduras.

a and *b*, clay figurine heads, mold-made. *c*, clay negative mold from Sula-Ulúa kiln. *d*, positive clay cast from mold, made for authors. Honduras.



Clay figurine heads and whistles, all mold-made except *d*, *g*, and *e*. Sula-Ulúa, Honduras.

At the very top of the kiln and near the bottom on the inside were some pottery sherds, while all through were lumps of burned clay. The majority of sherds, pottery molds, and figurines were scattered about the exterior of the kiln at the same level as the floor. There was also one small piece of jadeite in the shape of an axe god.

Careful examination of the sides and interior of the kiln revealed no trace of metal nor of anything which might have served as a lid.

The objects found in and around the base of the kiln can be divided into five classes, excluding the one piece of jadeite. This was the only evidence of a stone object not for utilitarian purposes, and suggests trade with eastern Central America.[13] The five classes are: (1) pottery sherds; (2) pottery molds; (3) pottery figurines and figurine whistles; (4) stone and pottery tools; (5) miscellaneous objects.

1. The sherds in themselves offer an interesting picture of the influences playing a part in Sula-Ulúa culture. They can be divided into three principal groups, the largest being Maya, which in turn can be subdivided into three classes in combination with other influences.

The first pottery type to be considered is monochrome. Monochrome pottery is found without any trace of design, with simple incised lineal and punctate motifs, with occasional appliquéd handles, and with highly-conventionalized scroll and glyph patterns. This monochrome group (Pl. IV) is composed of two elements, with the exception of Pl. IV *b*. These two influences are Paya[14] and what we call here, for want of a better name, Sula-Jicaque.[15]

The Sula-Jicaque pieces are shown in Pl. IV *c*, *e*, and *g*. They are made of a rough sandy clay, and are cruder in design and execution than any other pottery group from this area. When, on this ware, there is an attempt at ornamentation other than the uneven and often faint incisions showing evidence of hurried execution, it is a crude applied head of what may be the rat-bat (Pl. IV *c*) or the monkey (Pl. IV *e*). The lips of these sherds are narrow rims projecting only on the exterior portion or they are perfectly plain, as in Pl. IV *e*. Pottery of this type appears all over the Sula-Ulúa region, and up the Ulúa valley, to the authors' knowledge, as far south as San Nicolás near the ancient site of Tencoa.

The Paya pieces consist mostly of the formalized scroll ware, which was used in the Sula-Ulúa as the inspiration for the famous Ulúa marble vases. A typical Paya-type sherd is shown in Pl. IV *a*. Low annular bases, typical of a certain class of Paya monochrome ware,[16] were also found.

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[13] Stone, 1941. [14] *Ibid.*

[15] *Ibid.* Also based on unpublished collections of potsherds made by the author at historical Jicaque sites such as Cangelica and Candelario (see Anguiano, 1908, pp. 392, 395). [16] *Ibid.*

The next group of sherds are those which Strong, Kidder, and Paul call "Bold Geometric,"[17] and which Stone[18] classifies as Lenca, or possibly Lenca with Maya influence (Pl. V *a–d*). Pl. V *a–c* belong to a single vessel. The shape of the whole, as it appears from the sherds, apparently was a rounded bowl with a bulge or projection near the center. The design is a boldly-executed, geometrical pattern in red and black on a red-orange background. As we can also see from the sherds, there was a conventionalized figure, either animal or human, making up an important part of the top portion of the vessel. Both the shape and the ornamentation suggest pottery found in Lenca country (e.g., compare the pot found by Strong in the valley of Olancho,[19] historical Lenca country according to the accounts of Vasquez[20]). The formalization of the figure may be Maya influence. However, there is not enough evidence among these sherds to permit any conclusion. There is also a sherd with a conventionalized monkey head as handle. This is another Lenca characteristic, and appears on pots from Lake Yojóa and the Comayagua valley, as well as from Olancho.

The majority of sherds from the kiln, however, are Maya in pot form and in design. There is a quantity of dark red ware with a faint suggestion of pattern in a lighter red-orange (Pl. III *c* and *d*). Most of these sherds come from cylindrical, and probably legless, pots, some with two parallel indented lines forming a border around the top. Where there is a design, it is in plain vertical and horizontal stripes, as in Pl. III *d* and Pl. VI *d*, or it is in the equally simple half-circle-and-tongue pattern as in Pl. III *c* and Pl. VI *e*. Pl. V *g* shows a typical Sula-Ulúa Maya piece. The background is light orange, with the very Maya figures and glyph-like border in red and black. The inner or reverse side of this piece has an elongated conventionalization of the feathered serpent, a very common interior design on Ulúa-Maya pots.

In Pl. VI we see a variety of polychrome Maya-type sherds. Figure 4*a*, *b*, *c*, *f*, *g*, and *j* are characteristic of the Ulúa-Maya. Pl. VI *a*, *f*, and *g* are from wide cylindrical pots generally legless, but sometimes with three stub legs, and usually with some representation of dancing or copulating figures. Pl. VI *b*, *c*, and *j* are associated with the feathered serpent motif. Pl. VI *d*, mentioned above, is a slight variation of the red-on-orange type: the border is red, and the background orange, but the vertical stripes are lighter, being almost cream color. Pl. VI *i* is a fragment from another cylindrical Maya-style pot, which probably was decorated

[17] Strong, Kidder, and Paul, 1938, Pl. 7.
[18] Stone, 1941. [19] Strong, 1934, Fig. 54, p. 46.
[20] Vasquez, 1716, t. 2, lib. 5, p. 445, col. 1, p. 446, col. 2, and p. 447, col. 1.

with some sort of formalized serpent design. While Pl. VI *h* and *k* can be put with Ulúa-Maya, they show what may be a Lenca-Maya combination. The border motif of Pl. VI *h* is typical of Lake Yojóa pottery, as is also the design below. On the reverse side, however, appears again a serpent conventionalization formalized to the point of vertical stripes, but, nevertheless, related to the pattern on the reverse of Pl. V *g*. Pl. VI *k* is from a dish with low edges. The stepped design frequently is used on pots in the Lenca area. The whitish portion to the left has been hollowed out, an interesting evidence of reworking and change in design style. Pl. VI is another example of bold Ulúa-Maya workmanship. The coloring is red and orange on a lighter orange background.

Pl. V *e*, both from its geometrical (although lineal) design and the unusual coloring—red on a cream-white background— may be the potter's interpretation of the same type of ware found by Strong, Kidder, and Paul[21] at Naco, Honduras. If this is so, it would bespeak Nahua influence. The sherd itself is not a common Ulúa-Maya type. Pl. V *f*, on the other hand, although a blocked or checkered design, follows the usual red-on-light-orange coloring, and as a pattern is found both on ware from the Lenca country and on Ulúa-Maya pieces.

There is a whole group of shallow, tripod dish sherds, all pointing to the Maya both in form and design. They are also pieces of light red-orange background with the design in red and black, although a few pieces use two shades of red, one less brown than the other. Specimens of this style are illustrated in Pl. V *h*. The bold manner of glyph-like conventionalization of the serpent motif should be noted, as it is characteristic of Ulúa-Maya and may or may not have Lenca influence. These pieces have a design on both sides, the exterior adhering to formalizations in a geometrical manner. There is one sherd belonging to this group which bears special mentioning both because of the use of cream-white as a background to emphasize the principal design and what appears to be a Maya conventionalization of the water fowl motif prevalent on Lake Yojóa pottery. This piece is painted in the same bold manner as the rest, and has a similar geometrical pattern on the reverse side, with, however, white background accents.

There remain two monochrome but special styles of potsherds to be discussed. Pl. IV *f* is a fragment of a raised apron from a pot, a brittle ware, having a quality almost like slate. This particular stepped design with holes or indication of holes is a Paya motif and has been copied in the Sula-Ulúa especially in connection with the marble vases.[22]

We can say, generally speaking, however, that the slate-like ware is

[21] Strong, Kidder, and Paul, 1938, Pl. 3. [22] Stone, N.D.

Ulúa Maya. Several pieces of this sort, with Maya glyph-like designs, have been found on the top level of Travesía,[23] and at the kiln there are several other slate-like specimens which, although without design, are Maya in pot shape.

Pl. IV *b* is a typical Maya sherd of a different quality of clay. It is a monochrome piece with an incised glyph-like design.

2. Pottery molds are all the formalized, fat, squat female figures with circular ear-plugs and bracelets, and various styles of low headdresses that are found as figurines in the Sula-Ulúa and in Lenca country such as the section east of the Lempa in the present republic of El Salvador.

The mold in Pl. VII *c* has a necklace which, as can be seen from the imprint made in Pl. VII *d*, probably represents a jadeite pendant or axe god with a jadeite bead on either side.

3. The figurines and figurine whistles show as great a variety of influences as the pottery sherds. Pl. VII *a* and *b*, for example, are heads of two pieces from molds similar to those described above. It has been pointed out already that such objects have been noted in country that is Lenca, but within easy touch of Maya culture. The general appearance of the heads is not Maya. They lack the elongated, artificially-flattened forehead of Maya figurines, and, on the whole, possess a quality quite their own. Pl. VII *a*, however, has what is very unusual in such pieces: filed teeth, a decided Maya decorative feature.

The seated figure in Pl. VIII *k* represents a different type from the fat female pieces. This is an unusual figure, having a characteristic that recalls certain stone figures from Nicaragua. There are three very interesting details here, however: (*a*) the moustache following the full length of the lip; (*b*) what appears to have been a bead in the partially-opened mouth—a Maya burial custom, the bead, usually jadeite, being used for the dead as money in the other world; and (*c*) the decided slant to the forehead, which, although fitted to the squat shape of the figurine, nevertheless appears to be an example of artificial flattening. A fragment of a face from the kiln with both filed teeth and a nose-plug suggests another Maya touch.

Pl. VII *a* and *b*, Pl. III *b*, and Pl. VIII help illustrate the variety of heads and whistles. Pl. VIII *d* and *g*[24] are typical Paya bird heads, both in conception and execution. Pl. VIII *a* has the high, peaked headdress associated with the "archaic" culture of Mexico. The rest of the pieces with the exception of *e* are fairly common Sula-Ulúa types. The whistles demonstrate to some extent the variety of headdress and whistle styles

[23] Stone, 1941, Fig. 54, and Fig. 91.

[24] Note similarity between *g* and the head of Fig. *c* on Pl. CXC of Vol. II, *Pottery of Costa Rica and Nicaragua*, S. K. Lothrop.

prevalent in this area. In addition, *i* has a face between the legs, a characteristic of a certain class of Sula-Ulúa whistles. Pl. III *b* is the head of an animal, showing to what extent conventionalization and detail have been combined in this section. Pl. VIII *e*, a beautifully executed pot leg in the shape of a head, bears traces of light orange paint and portrays not only a European-style moustache, but also what probably is a European-style face. This may or may not be Maya; if so, it is almost certainly the result of the latest or European period and might well offer a clue as to the approximate date of the kiln.

There were also a number of cruder, handmade heads, mostly bird, such as those shown in Pl. VIII *g*, suggesting the Paya.

4. The stone objects from the kiln consist of small round stones, such as are found in river-beds, which probably were used to polish the clay pots. There were, also, a small stone pestle, and a hollowed-out stone which appears to have been used as a mortar, possibly in the work of pounding river shells and stone to be used as coloring matter.

5. Three clay "candelaria" were found at the base of the kiln. Two are one-holed, and the other is two-holed. Considering that here was a pottery kiln where there is actual evidence that polychrome pottery was produced, and that similar "candelaria" have been found in the Sula-Ulúa bearing traces of coloring matter in the interior,[25] it is not unreasonable to suppose that these "candelaria" with their vial-like shape, and rough, clay, undecorated exterior, might well have been used as some sort of paint-container.

There were any number of thin circular pieces of clay with a hole through the center. None of these bears evidence of designs. They may have been intended for clay beads, or they may be that object commonly called a "spindle-whorl."

There remains only one object yet to be considered. This is an elongated clay bead, one end of which is flattened and contains a hole for suspension. An interesting point concerning this bead is that an identical counterpart was found by Gordon,[26] who, however, calls it an "implement"; and another was found by Stone[27] on the steps of the Temple of the Bas-Reliefs at Travesía.

This concludes a list of the principal objects found in connection with the kiln. Despite the fact that a number of influences are evident in these pieces, there is strong reason to suppose that the people primarily responsible both for the kiln and its products were a Maya people, or close enough to Maya influence to be considered Maya in their

[25] Gordon, 1896, p. 25. Doris Stone has also found "candelaria" containing blue paint in a mound on the bank of the Ulúa river near Santa Ana.

[26] Gordon, 1896, p. 25. [27] Stone, 1941.

culture concept. This conclusion, reached by an examination of the artifacts found with the kiln, is strengthened by the historical knowledge brought out at the beginning of this paper: that a Maya dialect was in use in the Sula-Ulúa at the time of the Conquest, that at this time the Sula-Ulúa was a Maya province, and that the depth of the kiln at the time of excavation was near enough to the present surface of the earth to warrant the assumption that the kiln belonged to the last period of Sula-Ulúa pre-history.

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Tulane University
New Orleans, Louisiana
November, 1940

THE CEREMONIAL BAR AND ASSOCIATED FEATURES OF MAYA ORNAMENTAL ART

WALTER W. TAYLOR

IN 1913, Spinden published his monumental work on the artistic forms in Maya culture.[1] Since that time, many of his statements have assumed axiomatic character in the literature and discussion of Maya archaeology. However, as was to be expected, new information has tended to modify some of the generalizations put forward in 1913. In the present paper, I would like to offer evidence to support the hypothesis that certain artistic compositions, treated separately by Spinden, actually are members of a single complex, and then to review some of his generalizations in the light of this evidence and Maya chronology.[2]

The complex which I propose to demonstrate consists of the Ceremonial Bar, the Bar Pendant, and the Frieze-mask.[3] It is my thesis that the Bar Pendant is the conceptual equivalent of the Ceremonial Bar and, in actual practice, is substituted for the latter. Similarly, the Frieze-mask is conceptually connected with the Bar and, thus, directly or indirectly, with the Pendant. Evidently a process of substitution and convergence, already noted by Spinden,[4] has brought about a most intricate and thorough exchange of detail, form, and function.

Figs. 7 and 8 present some of the lines of typological association by which the above assertions may be evaluated. Fig. 7, A, shows the similarity in form and placement between the Ceremonial Bar and Bar Pendant. It is apparent that the trefoil (sometimes a quatrefoil) may replace the serpent head at the end of the central panel. In fact, it seems most probable, as both Gordon and Seler[5] pointed out with regard to cer-

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[1] Spinden, 1913.

[2] I wish to express my great appreciation to Dr. A. M. Tozzer, under whose interested guidance this paper took its initial form. I would, also, like to offer appreciative thanks to J. E. Thompson, Clyde Kluckhohn, and W. S. Stallings, Jr. for much help and valued criticism, and to Francis Richardson and the Carnegie Institution of Washington for putting their magnificent photographic files at my disposal.

[3] The Ceremonial Bar is a bar-like object, straight or curved, which is clasped to the breast of certain anthropomorphic representations in Maya art (Fig. 7: A, 1, and B, 1). The Bar Pendant is a horizontal pendant which hangs from the neck of, or appears apparently unsupported on the breast of, many anthropomorphic and other figures (Fig. 7: A, 4–7, and B, 5–6; Fig. 8: F, 5–6). The Frieze-mask is the large, full-face "mask" seen above the doors on certain buildings of Campeche and Yucatan (Fig. 7: C, 6–7, and D, 5; see also Seler, 1916, p. 20 ff.).

[4] Spinden, 1913, pp. 46, 123 ff.

[5] Gordon, 1905; Seler, 1915, pp. 44 ff. Much of the preliminary work on the present paper had been done when these references were discovered. Gordon's and Seler's approaches had been from the point of design, while mine began with the similarities in us-

tain forms, that the trefoil is merely a simplified snake's head. Fig. 7, B, gives other examples of this serpent head and trefoil equivalence. Other elements and motives common to Ceremonial Bars and Bar Pendants may be listed: (1) feathers at the ends of central panels instead of serpent heads or trefoils,[6] (2) criss-cross or plaited designs in the central panels,[7] (3) "serpent spots" in the central panels,[8] (4) plaited design in the vertical "collar" panels,[9] and (5) dots in the "collar" panels.[10]

Fig. 7 C, Nos. 2–5, are not "normal" Ceremonial Bars nor are they Pendants. However, if these representations were hung from the neck or clasped to the breast of a human figure, there could be no doubt as to their designation. I believe, therefore, that they are to be considered in the same light as normal Ceremonial Bars and regular Bar Pendants. The term "supported," as opposed to "enfolded," Ceremonial Bar may be coined to describe Nos. 3–5. No. 2 is not associated with a human figure but is believed to represent the "concept"[11] of a Ceremonial Bar. Fig. 7, C and D, show that the central panels of both Bars and Pendants may carry a face-panel. From this to the Frieze-mask with its central mask and lateral serpent heads, or their trefoil equivalents, is but a short step. The similarity of the "ear ornaments" on Frieze-masks (Fig. 7: C, 6; D, 5) to the ends of "collar" panels on certain Ceremonial Bars (Fig. 7: A, 2) shows that the elaboration of both forms runs to similar motives. The Bar Pendant seen in Fig. 8, F, No. 3, brings this form into the same grouping.

Fig. 8, E and F, submit more evidence for the association of the three members of the complex: Ceremonial Bar and Bar Pendant (Fig. 8: E, 1–2, 3–5), serpent head and trefoil (Fig. 8: F, 4–6), and Bar Pendant and serpent (Fig. 8: F, 1–3); also, this "plaited snake" motive may be seen in the wall paintings at the site of Santa Rita.[12]

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age and placement between the Bar and Pendant and from there led to the recognition of likeness in form and detail. Three independant approaches arriving at the same results would appear to lend weight to the conclusions.

[6] Piedras Negras, stelae 8, 34, 35; La. Hondradez, stela 4; Tikal, stela 16; Uaxactun, stela 4; Xcalumkin, two door jambs in the south building; Copan, stela D.

[7] Copan, stelae A, B, D, H, altar T; Naranjo, stela 6; Cancuen, stela 1; Nohoch Mul, stela 20; Yaxchilan, stelae 5, 9, 11; Quirigua, stelae D, K.

[8] The similarity of these "serpent spots" to the spots seen on shell representations is interesting in the light of what will be brought out below. Leiden Plate; Copan, stelae 2, 11, P; Yaxchilan, lintels 39, 48; Seibal, stela 9; Piedras Negras, stela 34; Palenque, pier of House D in the Palace.

[9] Tikal, stelae 1, 2; Naranjo, stelae 22, 25; Yaxchilan, stelae, 4, 14; Seibal, stela 10; Copan, stela 11; Piedras Negras, stela 2; possibly Polol, stela 2.

[10] Copan, stelae D, N; Naranjo, stelae 6, 13; Calakmul, stela 51; Palenque, Temple of the Sun.

[11] See under Ceremonial Bars and Bar Pendants in the description of Chart 1.

[12] Gann, 1897–98, p. 668, Pl. 30, Fig. 8.

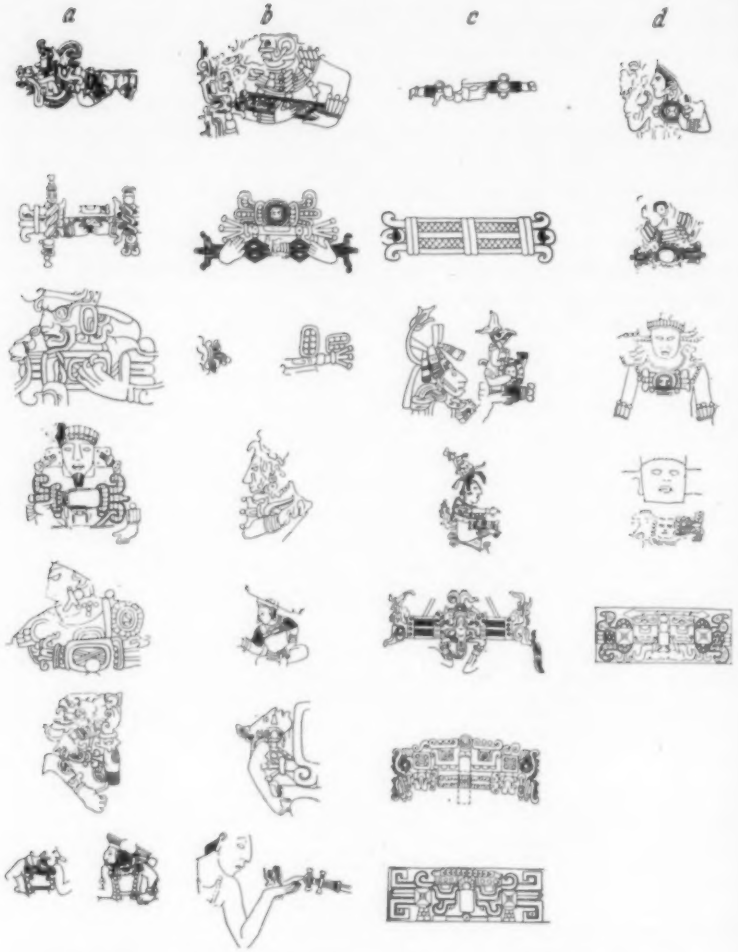

FIG. 7.—(Read columns vertically.) A: 1, Tikal, stela 1; 2, Copan, stela 11; 3, Quirigua, stela A; 4, Quirigua, stela D; 5, Yaxchilan, stela 5; 6, Quirigua, stela D; and 7, Copan, altar T. B: 1, Seibal, stela 10; 2, Tikal, stela 16; 3, Tikal, lintel of Structure 10; 4, Yaxchilan, stela 11; 5, Copan, stela B; 6, Quirigua, stela D; and 7, Palenque, palace, house D. C: 1, Ixlu, stela 1; 2, Copan, altar U; 3, Palenque, Temple of the Sun; 4, Xupa, slab in temple; 5, Palenque, Temple of the Sun; 6, Uxmal, Monjas; and 7, Chichen, Monjas. D: 1, Xultun, stela 3; 2, Piedras Negras, stela 13; 3, Quirigua, zoomorph P; 4, Quirigua, stela J; and 5, Chichen, Monjas.

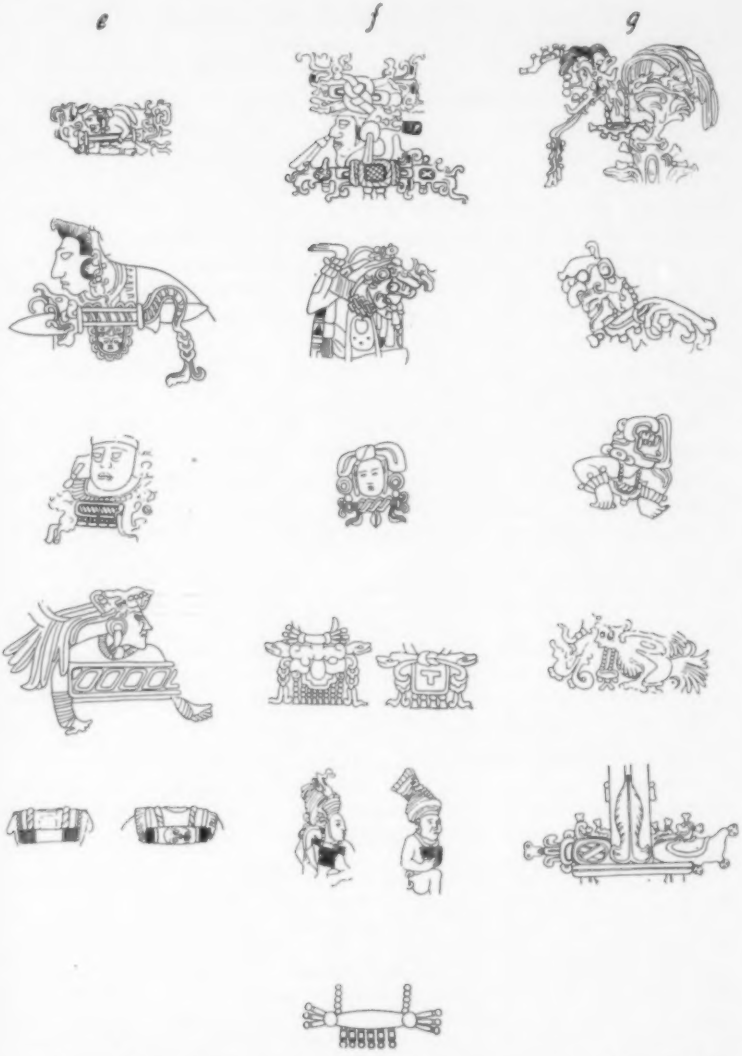

FIG. 8.—(Read columns vertically.) E: 1, Coban, pottery box; 2, Aguas Calientes, stela 1; 3, Quirigua, stela K; 4, Seibal, stela 7; and 5, Copan, Hieroglyphic Stairway. F: 1, Seibal, stela 1; 2, Palenque, Temple of the Sun; 3, Copan, stela D; 4, Copan, step of Temple 11; 5, Copan, stela N; and 6, Chichen, cenote. G: 1, Palenque, Temple of Fol. Cross; 2, Quirigua, stela D; 3, Quirigua, zoomorph B; 4, Xcalumkin, lintel; and 5, Palenque, Temple of the Cross.

Fig. 8, G, shows several Bar Pendants with a special form. This form has been identified as a shell and is associated with, and to be considered among, the various Maya water symbols.[13] Since, then, Bar Pendants can be shells and since both shells and serpents are water symbols, a conceptual connection between a serpent and the Pendant is logically possible, not to say probable. The balancing of a shell against a segment of Pendant again suggests an equation of the two forms (Fig. 8: G, 5).[14] Also, both shells and segments of Pendants are found alone and unattached, evidently as space fillers, on monuments at several sites.[15]

Further similarities in the presentation and elaboration of Bars and Pendants are observed in the use of "bone" chains[16] and in the presence of shells and "concepts" of Bars and Pendants within the feather headdresses of figures on many monuments.[17]

The question arises as to how significant all these substitutions and typological similarities are. Do they have meaning for the interpretation of Maya concepts and ideas or only for the understanding of artistic elaboration? There appears to be evidence to indicate that the artistic complex holds together because of basic ideas. First, there is the unifying concept of water symbolism. The case is strengthened by the existence of two consistencies which seem to govern the presentation of Bar Pend-

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[13] Tozzer and Allen, 1910, pp. 296 ff; Spinden, 1913, pp. 83 ff.

[14] Spinden has observed that this composition is characteristic of the "Two-headed Dragon" (Spinden, 1913, pp. 53, 66 ff). See also Maudsley (1895–1902, Vol. 4, Pl. 93), who was probably the first to draw attention to this design. Seler also demonstrated this connection between the "Dragon" and the composition (Seler, 1915, pp. 89 ff). It is important to note that this creature is very closely connected with water symbolism (Thompson, 1939, pp. 154 ff).

[15] Palenque, Temple of the Cross, west pier of House C in the Palace; Etzna, stela 5; Copan, stela 2. See also Codex Bologna, a Mexican manuscript, pp. 21, 26.

[16] Macanxoc, most if not all stelae. Quirigua, stela F; this chain, terminating in two large serpent heads, is accorded the same treatment as a true Ceremonial Bar. This is seen from the hands, which are in the same posture and position they often take when enfolding a Ceremonial Bar.

[17] Tikal, stela 16, lintel of Structure 10; Piedras Negras, stela 8; Palenque, House A east, Temple of the Foliated Cross, see Fig. 8: G, 1. In this panel, and also in that of the Temple of the Cross, the so-called "tree" is obviously highly anthropomorphized. It is my belief that the birds perched atop these "trees" or "crosses" substitute for the feather headdresses commonly found on human figures upon many monuments. In designing the composition, the usual headdress would not have been appropriate to, nor would it have fitted, such forms as these "crosses" or "trees". Replacement by an actual bird was not only typologically sound, due to the feathers, but also practically and esthetically expedient, making a reasonable composition and not a travesty. In this discussion, the bird is said to substitute for the headdress only because the latter is the more frequent form. It is highly possible that the feather headdress is the adaptation of an original concept concerning an actual serpent-bird.

ants and Ceremonial Bars. When the hands of the principal figure on a monument are occupied with separate objects, the Pendant substitutes for the Bar. For example at Quirigua, when the hands hold a Manikin Sceptre and a Shield, the Pendant is worn. Similar cases can be found on many monuments at many sites: Naranjo, Coba, Tikal, Yaxchilan, Itsimte, Piedras Negras, La Milpa, etc. It seems that when the Maya designer wished to have his subject handle several articles of paraphernalia, he released the hands for this purpose by suspending the usual Bar, which thus became a pendant.[18] There are some exceptions to this practice: cases in which the principal figure's hands are free and yet in which the Pendant is the form used.[19] There are also cases in which one hand covers the ornament but appears to be gesturing rather than holding the object.[20]

The second consistency is that when a figure is of secondary importance, i.e. when it is smaller than, or subservient to, a principal figure or when there is no one principal figure, the Bar Pendant is worn whether the hands are occupied or not. There appear to be fewer exceptions to this generalization. Stelae 1 and 4 at Yaxchilan are the only instances so far noticed, in which minor figures carry Ceremonial Bars. However, in the panel of full-figure glyphs on stela D at Copan, there is a small grotesque figure holding an atypical Bar. Also, in the wall-panel in the Temple of the Sun at Palenque, one of the priests, here secondary to the central assemblage, offers a Long-nosed God[21] on a supported Ceremonial Bar. For the rest, the generalization holds true with an apparently significant regularity.

In regard to these two consistencies, it may be suggested that the different paraphernalia, including the Pendant instead of the Bar, characterize a different, possibly minor, type of priest. However reasonable this view may be (and I think it perfectly reasonable), it does not negate the significance of the ubiquitous water symbolism and the typological affinities which indicate that, whatever the variations of priesthood or ornamentation, the same concept lies behind the use of both the Cere-

[18] The chronological implications of this statement will be clarified below.

[19] Piedras Negras, stela 15; Quirigua, stela C.

[20] Oxpemul, stela 12; Calakmul, stela 51; Yaxchilan, stela 11; Xultun, stela 3.

[21] This God is to be found in the jaws of the serpent heads on certain Ceremonial Bars, and also as the rear head of "Two-headed Dragons." Thompson (1939, p. 156) " . . . is inclined to interpret the so-called Quetzalcoatl façades of Yucatan as representing ["Two-headed Dragons"] . . ." The Frieze-mask is part of, or at least connected with, the Quetzalcoatl façade. Further, faces that appear very similar are found as central panels on certain Bar Pendants (Fig. 7: D, 3; Quirigua, stela F; etc.). Thus, we have one more element shared by all members of the complex. It is significant that the Long-nosed God is also intimately associated with water symbolism (Thompson, 1939, p. 160).

monial Bar and the Bar Pendant.[22] When both typology and use can be shown to be significantly similar and when the small differences can be explained by consistent generalizations, it is permissible to believe that we are dealing with a conceptually unified complex of elements.

Turning to the other member of the complex, it is significant that the Frieze-mask appears only in that area in which stelae are lacking or are of little artistic importance. In the region occupied by the so-called Old Empire, stelae, lintels, panels, etc. were the focal points of elaboration, and upon these the concept of the double-headed serpent, in its Bar and Pendant forms, was depicted. In the north, however, where architecture was the focal point, the same concept was applied in a form more suited to the size and character of the medium. This form is adumbrated in the Old Empire by the mask panels of Nakum, Tikal, Yaxchilan, and by the representations from Copan and Palenque (Fig. 7: C, 2 and 5). In these latter examples, there is no human background, no personalization, just as there is none in the Frieze-masks of Yucatan; and the resulting forms are remarkably similar.

The chronological picture is presented in Chart I. Due to several factors, such as illegibility of inscriptions etc., not all examples of Ceremonial Bars and Bar Pendants can be dated. However, I believe that there is enough material to give the picture validity. Details of the cartography of Chart I are supplied at the end of this paper.

The problem of the relationship between the members of the Ceremonial Bar, Bar Pendant, Frieze-mask complex is difficult to attack. It is possible that each member had a discrete origin. It is plausible that at one time there was one abstraction of a double-headed serpent, another of a rod-like pendant, another of a shell pendant, etc. To demonstrate this original divergence and the subsequent convergence would take more and older data than are available at the present writing. However, the consistency of the chronological picture, the remarkable, orderly progression of the types and sub-types in time, would seem to be a function of a sequential development on a basic theme, rather than a fortuitous amalgamation of entirely disparate concepts. True, there may have been bar-pendants before there were Ceremonial Bars or even before the appearance of the double-headed serpent idea, but it is very apparent from the chronology of Chart I that, by the time the Maya began to carve Bar Pendants on their monuments, these Pendants had already been influenced by the concept of a two-headed snake and had assumed the role of substitute for the Ceremonial Bar.

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[22] The fact that on some figures both Ceremonial Bar and Bar Pendant are present does not, in my opinion, alter the case. Reduplication is a common feature of Maya art.

Similarly, the late appearance, together with the typological affiliations, of the supported Bar and the Frieze-mask indicate, not their independent invention at such a time, but their development from some previously existing concept, the most logical of which is the straight form of the Ceremonial Bar.[23]

In the light of these typological and chronological considerations, several of Spinden's generalizations on the Ceremonial Bar can be profitably reviewed. At one point he says that straight Ceremonial Bars (and evidently means all Bars) " . . . apparently do not occur at Piedras Negras and Palenque, or at any of the cities of northern Yucatan."[24] This is correct with regard to "normal" bars, but from the illustrations in Figs. 7 and 8, it will be seen that the complex, in the form of the Supported Bar as well as the Bar Pendant, is represented at these places.

Then he says that "In its first phase the Ceremonial Bar is composed of a double-headed serpent with a flexible, drooping body. . . . In the second phase the central portion of the Ceremonial Bar is no longer pendant, but is transformed into a straight panel. . . . "[25] As examples of the first phase, he mentions the Leiden Plate and certain stelae at Copan (#2, 3, 7, E, P, etc.). Chart I shows that, with the exception of the Leiden Plate, the chronologically earliest form is the straight Ceremonial Bar and not the drooping Bar as Spinden claimed.[26] It also shows that the latter is found only at the site of Copan except for the two isolated examples of the Leiden Plate and stela 1 at Tulum.[27]

Finally, Spinden says that the diagonal Bar is a decadent form.[28] But he himself, in noting the diagonal Bar and early dating of stela 25 at Naranjo, gives the evidence to refute his statement.[29] Stela 25 is contemporaneous with the earliest drooping Bar at Copan.

If the Leiden Plate be excluded, we find that by the date when the first drooping Bar appears at Copan, both straight and diagonal Ceremonial Bars were well known, the former being of considerable antiquity. It is clear, therefore, that Spinden based his generalizations for

[23] Seler derived the Quetzalcoatl façade (and thus the Frieze-mask) from Mexican sources through the cult of Quetzalcoatl, the Plumed Serpent (Seler, 1916, pp. 72–73).

[24] Spinden, 1913, p. 50. [25] *Ibid.*, pp. 49–50.

[26] In a later paper, Spinden (1918, p. 173) notes that "At Copan this basic change [from drooping to straight Bar] does not appear until the end of the Middle Period, but at other cities the bar form is the only one found and possibly goes back to the beginning of the Middle Period." The Middle Period is from 9.10.0.0.0. to 9.15.0.0.0.

[27] There are "concepts" of drooping Ceremonial Bars on lintels 38 and 39 at Yaxchilan. These cannot be considered true Bars since they are neither enfolded nor supported and are grotesquely out of proportion to their accompanying human figures.

[28] Spinden, 1913, p. 58. [29] Spinden, 1913, p. 178; 1918, p. 173.

the whole Maya area on the data from Copan and the Leiden Plate. He made these statements without explicitly stating any assumptions to explain the obvious discrepancies.[30] It is necessary, therefore, to reject Spinden's results and to start afresh by re-evaluating the data and by making explicit assumptions which will reconcile all the facts with the least possible strain.

According to Chart I, it is clear that the starting point of a chronological and typological sequence for the Ceremonial Bar, and, really, for the whole complex, must be one of two forms, the drooping or the straight Bar. Since Copan is the only site at which both forms are present and from which, therefore, we can obtain relative chronological data, it is best to start our analysis with that site. Four possibilities arise:

1. The sequence at Copan, i.e. drooping to straight, may be atypical of the Maya area as a whole and the real order be just the reverse. The chronological chart (Chart I) might lend credence to this interpretation if it were not for the date of the Leiden Plate (8.14.3.1.12). Since this object is so much earlier than the earliest straight Ceremonial Bar (8.19.-0.0.0, stela 18 at Tikal), a sequence of straight to drooping seems out of the question. Checking the Copan order is impossible because, as has been said above, the drooping Bar is not found in association with other types of Bars at any other site in the Maya area.[31]

2. Copan may have invented the drooping Bar independently and therefore be a law unto itself with regard to its sequence. This is hardly possible in view of other cultural connections and the earlier existence of the drooping Bar on the Leiden Plate and at Tulum.

3. The third possibility would resolve the problem by making the date on the Leiden Plate non-contemporaneous and its true date very much later, within the range of Copan dates, 9.9.0.0.0 upwards for stelae with Bars. This would eliminate the need to explain the drooping Bar's very early occurrence, its subsequent long but temporary disappearance, and the peculiar re-focalization at Copan. But the evidence advanced by the Morleys[32] to substantiate the contemporaneity of the date must be accepted, not only because of the evidence itself but also be-

[30] Spinden (1918, p. 166) reaffirms his belief that "Copan still remains the most dependable city [for the exact demonstration of the historical order of development of the Ceremonial Bar], especially as regards the Early Period." Here again the discrepancies are unaccounted for.

[31] There is the possibility that a straight Ceremonial Bar, somewhat defaced and obscure, is depicted on Panel B in the west passage of the Temple of the Frescoes at Tulum. Since these paintings are protected from the elements by a "Toltec," i.e. late, structure (Lothrop, 1924, pp. 56 ff., 172), this would seem to make the straight Bar follow the drooping Bar of Stela 1, thus agreeing with the Copan sequence.

[32] Morley, F. R. and S. G., 1938.

cause of a lack of contrary indications other than the strange temporal isolation of this particular Ceremonial Bar.[33]

4. The Copan sequence may reflect the true development of the Ceremonial Bar over the area as a whole, but as a late, peripheral survival of events that had already occurred in other regions before the erection of now-existing, or now-known monuments. This assumption would explain both the date on the Leiden Plate and its stylistic affiliations with the very early stelae at Tikal,[34] making it a product of an earlier period when the drooping Bar was in common use and before the straight form became dominant. That Copan and Tulum should show peripheral lag is not strange in view of their geographical location and the latter's cultural position. This possibility is the only one that is congruent with all the data; it is the only logical possibility.

Thus, while we have returned to the outline of Spinden's sequence, the time perspective has radically changed and the foundations upon which the assertions are made appear considerably more substantial. The Copan sequence is only an echo, and we cannot predict, as has been done,[35] the age of a monument by the type of Ceremonial Bar it displays. Both straight and drooping Bars were known throughout the temporal range of all known examples of the Ceremonial Bar, with the possible exception that the Leiden Plate may represent a period when the straight Bar was as yet undeveloped.

After this re-examination and re-orientation of the data on the Ceremonial Bar, a very tentative interpretation of the material may be permitted:

At some time before the erection of those dated monuments which have come under our observation, from a religious concept of a double-headed serpent, a Ceremonial Bar of the drooping type arose. This probably occurred in the Peten, possibly in the vicinity of Tikal. The Bar spread southward and arrived at Copan an undetermined number of years before the erection of the first stela which bears a drooping Bar (stela 7, 9.9.0.0.0.). The Leiden Plate presents two possibilities: it may have been made in the Peten and carried to northern Honduras as a unique trade piece or as a representative of the actual southward movement of the Bar idea; or it may be indigenous and again indicate the minimum date by which the Bar reached the south. The former hypothesis seems the more likely in view of the stylistic affiliation with Tikal. During this time in the Peten, the Bar was undergoing modifications and,

[33] The date of the Tulum stela is so near that of the earliest stela with a drooping Bar at Copan that, for purely chronological purposes, it cannot be considered isolated.

[34] See Morley, F. R. and S. G., 1938.

[35] Lothrop, 1924, pp. 42 ff.

CHART 1

DATES	CEREMONIAL BARS					BAR PENDANTS			
	DROOPING	STRAIGHT	DIAGONAL	SUPPORTED	CONCEPT	STRAIGHT	RECURVED	NO PRONGS	CONCEPT
8. . . .	Leiden	T							
9.0.0.									
10.									
1.0.									T
10.									
2.0.									T
10.		Tikal[2]							
3.0.		Uax	Yaxha[3]						
10.		Uax							
4.0.		Xultun	(Cal)						
10.									
5.0.			Yax						Yax
10.		Yaxha							
6.0.									
10.	(Tulum)								
7.0.	(Tulum)	To				Yaxchilan			
10.			Yaxchilan						
8.0.									
10.									Pal[2]
9.0.	Cop		Mac, Nar			Mac			Cop
10.	Cop		Mac			Mac			
10.0.			Mac, Pus			Mac			
10.	Cop	Nar	Mac	Pal[2]	Pal	Mac,	Nar,		PN,
			Pus[2]			Yax, Pal	Naa		Pal
11.0.	Cop	To?	Nohoch			PN, Jai,			
						Nohoch	Yax		PN
10.	Cop		Mac		PN	Mac	Xul	PN	
12.0.	Cop		Pus						
10.	Cop		Nohoch, Mac			Mac, Yax, Nohoch, PN	Yaxchilan		
13.0.					PN	PN, Yax[2]	Yax		Pal
10.			Nar			Yax, PN	Nar, PN		
14.0.	Cop	T	Pus			T	T, El Pal.	Nar	
10.			Nar				Cal, Nar, El Pal		

Calakmul

CHART 1 (Continued)

DATES	CEREMONIAL BARS					BAR PENDANTS			
	DROOPING	STRAIGHT	DIAGONAL	SUPPORTED	CONCEPT	STRAIGHT	RECURVED	NO PRONGS	CONCEPT
15.0.		Cop[3], Yax	Pus	Cop?	Cop[3]	Its, PN, Cal, Yax, Cop[4]	Cal[3], Oxp[3]	PN	Its
10.					Yax	Yax[3], T, Its	T,		T
16.0.		Q, Cop				Cal, Yax	Oxp, Q Yax[3]	Cop[3]	
10.		Cop, Yax	Yax[3]		Q, Cop	Cop, Yax[3], Xcal[3], Q	Q[3]		Cop[3], Q
17.0.		Cop, Q[2]				Cop[4]	Q[2], PN	Cop	Cop[4]
10.		Cop[3]				Cop,[4] Nar, PN	Nar[2], La Mil	Sei, La Mar	Q, Cop[3]
18.0.		Nar, To	Nar		AC	Yaxha, To?, PN	Nar, Q[4]		Tenam, AC, Etz
10.		Hon	Can, Nar[3]			Q, Can, PN, Hon, Nar	Nar[3], Q[3]	Sei, La Mar	Q
19.0.		Nar					Nar		Amelia
10.		Nar							
10.0.0.									
10.									
1 . .			Ixlu, Sei, T		Sei[3]	Sei	Xul		Sei

Yaxchilan

Copan

by the date from which we have the earliest example of Ceremonial Bar in that area (8.19.0.0.0?, Tikal, stela 18), it had taken on its straight form. Later, by the date of 9.9.0.0.0., through further modifications, the diagonal Bar developed. At about this time, the Bar Pendant appeared, developing either from changes in the Ceremonial Bar or from a rod-like pendant subjected to influences from the double-headed serpent—Ceremonial Bar concept. It is likely that the straight Bar and Bar Pendant moved south together, since they appear at Copan simultaneously, considerably after their presence is noted along the Usumacinta River. In Campeche and Yucatan, the Bar Pendant flourished and spread. In this region, the Bar-and-Pendant conceptualization was transferred to architecture, the dominant form of artistic expression. With the northward

shift of Maya high culture, the true Ceremonial Bar disappeared along with the esthetic supremacy of its homeland in the south. In the north, the Bar Pendant and the Frieze-mask carried on the conceptual complex, apparently until art and architecture died out among the Maya.

CARTOGRAPHY OF CHART I

The dates of the chronological chart have been derived from *The Inscriptions of Peten* (Morley, 1938) with the exception of the date of stela 1 at Tulum (Thompson, Pollock, and Charlot, 1932, pp. 193 ff). From the former work, the sure dates, those with one query (90% probability of correctness), and those with two queries (60% probability of correctness) have been used. In the case of stela 43 at Calakmul (9.4.0.0.0.), the deciphered date has been used but within parentheses, since Morley, on stylistic and associational grounds, believes that this reading is non-contemporaneous and too early (Morley, 1933, pp. 200–201). The somewhat controversial date of stela 1 at Tulum is treated in the same manner. Arrows are used when a monument has been dated within a range of dates.

SUPERSCRIPTS refer to the numbers of representations of that design at that site at that date.

CEREMONIAL BARS

(1) Drooping: central panel curved, "flexible."
(2) Straight: central panel a "rigid," horizontal parallelogram (Fig. 7: A, 1).
(3) Diagonal: central panel a "rigid" panel at an angle to the body of the bearer (Fig. 7: B, 1).
(4) Supported: central panel supported from the bottom, not enfolded (Fig. 7: B, 3–5).

Concept = a design which has the attributes, in whole or in part, of a Ceremonial Bar, but which is not held or treated as one.

BAR PENDANTS

(1) Straight: trefoil or prongs straight (Fig. 7: A, 7; B, 3 and 6).
(2) Recurved: trefoil or prongs bent back upon themselves (Fig. 7: A, 4 and 6; D, 3).
(3) No prongs: merely a bar (Fig. 8: E, 5).

Concept = a design which has the attributes, in whole or in part, of a Bar Pendant but which is not in the proper position; or an object in the proper location but which does not have the attributes of a true Bar Pendant.

Site symbols:

AC.....Aguas Calientes	La Mil...La Milpa	Q.....Quirigua
Cal.....Calakmul	Mac.....Macanxoc	Sei.....Seibal
Can.....Cancuen	Naa.....Naachtun	T.....Tikal
Cop.....Copan	Nar.....Naranjo	To.....Tonina
El Pal....El Palmar	Nohoch..Nohoch Mul	Uax.....Uaxactun
Etz.....Etzna	Oxp.....Oxpemul	Xcal.....Xcalumkin
Hon.....La Hondradez	Pal.....Palenque	Xul.....Xultun
Its.....Itsimte	PN.....Piedras Negras	Yax.....Yaxchilan
Jai.....Jaina	Pus.....Pusilha	

LIST OF SITES AND MONUMENTS BEARING CEREMONIAL BARS AND BAR PENDANTS[28]

Site	CB	BP
Aguas Calientes		
stela 1	x	x
La Amelia		
stela 1		x
Calakmul		
stela 9		x
39		x
43	x	
51		x
52		x
53		x
62		x
89		x
Cancuen		
stela 1	x	x
Chichen Itza		
Ball Court		x
T. of Warriors		x
Cenote		x
Coba		
stela 9	x	x
12	x	?
14	x	x
15	x	x
Comalcalco		
E. wall of tomb		x?
Copan		
stela 1	x	
2	x	
3	x	
5	x	
6	x	
7	x	
11	x	x
A	x	
B	x	x
C	x	
D	x	x
E		x
F	x	
H	x	x
I	x	
M	x	
N	x	x
P	x	
altar L		x
Q		x
T		x
U	x	
altar of stela N	x	
Temple 11		x
22		x
Hieroglyph Stairway		x
Dzehkabtun		x
Etzna		
stela 5		x
La Honradez		
stela 4	x	x
Itsimte		
stela 1		x
4		x
5		x
6		x
Ixkun		
stela 1	x	
5		x
Ixlu		
stela 1	x	
2	x??	
Jaina		
stela 1		x
Macanxoc		
stela 1	x	x
2	x	x
3	x	x
4	x	x
5	x	x
6	x	x
8	x	x
La Mar		
stela 1		x
2		x
La Milpa		
stela 7		x
Motul de San Jose		
stela 2		x
Naachtun		
stela 2		x
Naranjo		
stela 2		x
6	x	x
7	x	x
8		x
9	x	x
12	x	x
13		x
14	x	
19		x
20	x	x
22	x	
24	x	x
25	x	
28		x
31	x	
32	x	
35	x	
Nohoch Mul		
stela 18	x	x
19	x	x
20	x	x
21	x	x
22	x	x?
23	x	x?
Oxpemul		
stela 9		x
12		x
17		x
Palenque		
Palace house A		x
C		x
D		x
Temple of the Sun	x	x
Temple of the Cross		x
Temple of Fol. Cross		x
Temple of Inscriptions		x
El Palmar		
stela 8		x
10		x
Piedras Negras		
stela 4		x
6		x
8	x	x
9		x
11		x
12		x
13		x
14		x
15		x
33		x
34		x
35	x	
lintel 2		x
4	x	
Polol		
stela 2		x?
Pusilha		
stela C	x	
D	x	
E	x	
K	x	
M	x	
P	x	
Quirigua		
stela A	x	
C	x	x
D		x

[28] Completeness cannot be claimed for this list. But within the limits of the literature and photographic files, it may be safe to estimate that it represents over seventy-five per cent of available material. In the tabulation, "concept" representations have been given full weight.

LIST OF SITES AND MONUMENTS BEARING CEREMONIAL BARS AND BAR PENDANTS (Continued)

Site	CB	BP
E		x
F	x	x
H	x	
I		x
J		x
K		x
altar L		x
altar of zoomorph O		x
altar of zoomorph P		x
zoomorph B		x
O		x
P		x
Seibal		
stela 1		x
3		x
5		x
7		x
8	x	
9	x?	x
10	x	
11	x	
Tayasal		
stela 1	x	
Tenam		
stela 1		x
Tikal		
stela 1	x	
2	x	
5		x
9		x
11	x	
16	x	x
18	x	
lintel of struct. 10		x
Tonina		
stela T- 5	x	
T-12	x	
T-14	x	
T-20	x	x?
T-26	x	
statue	x	
Tulum		
stela 1	x	
Temple of Frescoes	x?	
Uaxactun		
stela 3	x	
5	x?	
6	x?	
9	x?	
14		x
18	x?	
19	x?	
20	x	
Uxul		
stela 11		x
La Venta		
stela 2	x?	
Xultun		
stela 1		x
3		x?
5		x
18	x	
Xcalumkin		
Temple of Initial Ser.		x
South bldg.		x
lintel		x
Xupa		
slab in Temple	x	x
Yaxchilan		
stela 1	x	x
4	x	
5		x
6		x
9		x
11		x
14	x	
16		x
27		x?
30		x
lintel 5		x
6		x
7		x
9		x
13		x
14		x
17		x
32		x
33		x
36	x?	
38	x	
39	x	
40	x	
42		x
43		x
48		x
51	x?	
53		x
55		x
seated stone statue		x
Yaxha		
stela 2	x	
4	x	
5	x	
6		x?
12	x?	
13		x
Ulua Valley[37]		
flask		x
Costa Rica[38]		x
Nebaj, Guat.[39]		x
San Augustin Acasaguastlan[40]	x	

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[37] Spinden, 1913, p. 74, Fig. 94. [38] Joyce, 1916, p. 59.
[39] Mason, 1928, Pt. II, Pl. 29. [40] Saville, 1919.

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Peabody Museum
Cambridge, Massachusetts
November, 1940

WILLIAM JOHN WINTEMBERG

1876–1941

DIAMOND JENNESS

WILLIAM JOHN WINTEMBERG was born at New Dundee, Ontario, on May 18, 1876. Even in childhood he was extremely delicate, and more than once the family doctor pronounced that his weak heart would never carry him to manhood. As soon as he was old enough to leave school his father apprenticed him to a tailor, but the boy was so unhappy that he packed up his books and ran away to Toronto, where a printing firm engaged him as a compositor. After handling lead type for a few years he developed lead-poisoning, and gave up this work for the only other employment he could find, brass- and copper-smithing. Neither occupation was very remunerative; in 1911, when he was accounted a skilled coppersmith, his salary for a ten-hour day was only $12 a week.

Always debarred from any strenuous pursuit by his weak heart, Wintemberg was from boyhood an ardent student who could never pass a second-hand bookstore without brooding over some of its musty volumes and counting the dimes in his pocket. He collected butterflies and other natural history specimens, burrowed into the early history of his own and neighbouring counties, listed place-names and their origins, picked up old Indian implements and mapped the positions of ancient Indian village sites and burial places. With the help of a friend he organized a society in Toronto for the study of folklore. These antiquarian activities brought him into contact with the Director of the Ontario Provincial Museum, Dr. David Boyle, who sought his help in arranging and labelling the museum's specimens, then exhibited in the Normal School, and later tried to attach him to the museum staff. Though the provincial government of that day did not fully appreciate Boyle's needs and supplied him instead with a good party member who could not distinguish an arrowhead from an axe, Wintemberg maintained a close connection with the Provincial Museum until 1911 and published many valuable papers on Ontario archaeology in its series of Annual Reports. In that year he attached himself to the Victoria Memorial Museum (later the National Museum of Canada), in Ottawa, first as a part-time field-worker, then from 1912 as a full-time preparator on its staff. This association marked a happy turning-point in his life; it released him from the manual labour for which he was physically unfit and enabled him to devote all his energies to the things that lay nearest his heart, the archaeology of eastern Canada, and Ontario place-

names. In 1925 the department in charge of the National Museum promoted him to Assistant Archaeologist and in 1937 to Associate Archaeologist, a position he held until his death on April 25, 1941.

One of his first major achievements was the excavation, in 1912 and 1915, of the old Indian village at Roebuck, forty miles south of Ottawa. His careful description and analysis of the Roebuck remains have been a basis for all later investigations into Ontario archaeology. After this came studies of other Ontario sites, and brief outlines of his discoveries in Quebec and the Maritimes, until in 1929 he was ready to publish his "Distinguishing Characteristics of Algonkian and Iroquoian Cultures," which has been an unfailing reference work for amateur and professional archaeologists alike. Despite his poor health, and the knowledge that his life might be cut short at any moment without warning, he twice explored the north shore of the Gulf of St. Lawrence and in 1929 travelled up the northwest coast of Newfoundland. There too his investigations bore fruit. They extended the range of the Iroquois along the north shore of the gulf as far east as Kegaska; and they revealed, rather surprisingly, that Eskimo, not Indians, had occupied the whole north coast of Newfoundland before the coming of the white man, and that these Eskimo were an offshoot of the mysterious 'Dorset' people who have left numerous remains in the Hudson Bay region, but none at all in the western Arctic. On one of his last field-trips he located and partly excavated, near Waubaushene, Ontario, the site of the old Jesuit mission of St. Ignace II where Fathers Breboeuf and Lalement were massacred in 1649 by the Iroquois.

Besides his early contributions to the Annual Reports of the Ontario Provincial Museum, and his reports in the National Museum of Canada series, Wintemberg published a large number of papers, some of them in the Transactions of the Royal Society of Canada, which showed its appreciation of his work long before it elected him Fellow in 1934. His papers cover a variety of topics, among them place-names, though the immense mass of notes he collected on that subject still awaits an editor. He also gathered much material on the history of lighting in pre-electricity days, which he hoped to incorporate into a treatise and illustrate from his private collection of old lamps and candlesticks, one of the best on the continent.

Wintemberg's home in Ottawa was an artistic delight. It was built according to his own plans, with door-knockers and other wrought-iron ornaments of his own making. Much of its furniture he made himself, for he was a skilful and sensitive craftsman. It is amazing that a man who was always conscious of walking on the brink of the grave should have possessed the high faith to attempt so many things, and the

tenacity to succeed in everything he undertook. Success, however, was a word that he rarely used. Without question he was the leading authority on Canadian archaeology, and his advice was sought by scholars everywhere; but he remained always the simple and modest student, eager to learn and to help others in their quest for knowledge. His life's motto was work, work not for material things, for he never valued money or the ordinary things that money will buy, but work to extend man's knowledge and to reveal something of the beauty and truth of life. The afternoon before his death he was admiring the dandelions on his lawn; and after he re-entered his house and was browsing through his papers he slipped this quotation from Leonardo da Vinci into a book he had been reading:

"Life well spent is long. Thou, O God, dost sell unto us all good things at the price of labor. A well-spent day brings happy sleep, so life well used brings happy death. I thought I was learning how to live. I have been learning how to die."

FACTS AND COMMENTS

A PRELIMINARY REPORT ON POTTERY MAKING AT GAY HEAD, MARTHA'S VINEYARD, MASSACHUSETTS

The Gay Head people make two types of product, namely unfired clay receptacles and fired ware.[1] The craft is surviving because there is a fairly profitable tourist trade demanding a supply of souvenirs.

The peculiar varicolored clay banks provide raw material of unique merit. The individual clays—red, white, green, yellow. etc.—are dug, with shovels or sticks, and kept separately. The preparation of the paste and the building processes are the same whether the finished piece is fired or not. The clay is first allowed to dry, then broken up into fine particles and sifted through a household sieve to rid it of lumps. There are no megoscopically discernible inclusions in the clays, and the adding of temper is unknown. The mixing of the paste is done in an iron receptacle, usually with a wooden pounder, and invariably with the aid of a roughly whittled wooden spatula. A kitchen knife is often employed in scraping the paste from the wooden tools. The potter judges the desired state of texture empirically; she adds either powdered clay or water as she sees fit, and accomplishes a satisfactory degree of compactness by hand kneading and by impact of a lump of paste against some hard surface (table, barn wall, etc.).

The constructional technique depends on two methods. (1) Modeling, in which a lump or block of paste is worked by finger manipulation which reduces the original amount of raw material. In making a piece of several colors, the corresponding pastes are superimposed and compacted, the streaky variegated effect then being fully revealed upon scraping. Candle sticks, ash trays, canoe-shaped pieces, and simple, open bowls are produced by modeling. (2) Segmental construction by morsels. Upon a basal part, patted and modeled in hands, the wall is built by adding a number of irregular increments of paste and bonding them into a desired shape. This method enables the potter to construct jars and pitchers of dimensions which might be cumbersome to attain by modeling.

Surfacing entails scraping, "shaving," and hand smoothing. Tool polishing with a pebble, shell, rind, stick, bone, etc., appears to be unknown.

Drying is started in a shaded place, usually in a barn, and after several days the specimens not to be fired are exposed to the sun for three to five days. The total time is determined by weather conditions, particularly by the wind and humidity. It seems, however, that normally about one week is a fair average for drying of those pieces which are not subsequently fired. It must be remembered that such products are valued because of the striking colors, and that although they contain clay which apparently holds together well under pronounced dryness, they are not particularly utilitarian. The vessels to be fired undergo about half the amount of drying, yet are also exposed to direct sun with care and deliberation. No matter what the original color effect in the plastic state, all but reddish and whitish hues are completely lost in the kiln used for firing.

To construct a piece by modeling, five to eight minutes of time seems to be requisite. In the segmental variant depending on morsels, sometimes as much as one hour is said to be necessary. The surfacing averages some two to three minutes of time. In both methods of manufacture, the potter works either clockwise or counterclockwise. The choice apparently depends on the dexterity or preference of the individual. It has been

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[1] Two families, both directly descended from Wampanaog stock, are active as potters. For ethnologic data on the Gay Head peoples see GLADYS TANTAQUIDGEON, "Notes on the Gay Head Indians," *Indian Notes*, Vol. 7, No. 1, 1930. For definitions of various manufacturing processes in hand made pottery see V. J. FEWKES, "Methods of Pottery Manufacture," AMERICAN ANTIQUITY, Vol. 6, No. 2, pp. 172 ff., 1940

stated by an enthusiastic native that one potter holds the record of making 108 pieces in a single day.

Pottery making at Gay Head is an exclusive craft of the women. However, men usually take care of digging and bringing home clays.

Prices of individual pieces range from fifteen cents to five dollars. There can be no doubt that the continuation of the potter's craft, however affected by commercial demand and by the opportunist's response thereto, is an economic asset. The family of Chief Harrison L. Vanderhoop is said to have been realizing enough from pottery making to pay for the tuition fees of several children.

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A FURTHER NOTE ON THE SQUIBNOCKET CLIFF SHELL HEAP

In the recently published paper *Two Sites on Martha's Vineyard*, the section devoted to the Squibnocket Cliff site included speculation as to the manner of accumulation of the midden deposit, and included a statement that of the portion of the site remaining, the most complicated in structure lay near the edge of the cliff. It was further implied that the center of the deposit had vanished into the sea, and that only the outer fringes remained.

Doubtless these passages created an impression that the authors felt that there was a center of occupation on which the site grew up, perhaps not in concentric layers, for it was specified that horizontal overlapping of strata occurred, but in eccentric overlapping layers. Certainly the cross section through the site shown in our Fig. 13 suggests that the center of occupation had been in the south end of the trench, shown in the upper part of the figure.

It was in the fall of 1938 that the hurricane swept these coasts, but not until recently had the writer had an opportunity to revisit the site. Then only a cursory examination of the section exposed on the sea cliff was made, but certain interesting facts were noted. The hurricane and succeeding storms have cut the cliff back to a point just behind Hearth 2 in Fig. 13, or approximately one meter from stake S1. To the west of the end of the trench the section exposed in the face becomes as complicated as that shown in Fig. 12, including a pit filled with shells in the manner shown in Plate VII*b*, and a layering not greatly different from that in Plate VII*a*. This seems to grow out of Shell Layer *c*.

The implications of such a situation are of extreme importance from the point of view of stratification at any midden site. This may represent a sub-center on which midden accumulated contemporaneously with the accumulation of midden in the area uncovered by our excavations, or it may be older or younger than the latter. Although the depth of the deposit is insignificant in comparison with that of deep sites, the same principles still apply and should serve as a warning to every worker to observe meticulous caution in observing strata or hazarding guesses as to the center of occupation of a site. Obviously, intersecting trenches do no more than give a sample of what is to be found.

One final note concerns animal remains. A fragment of mandible was taken from the lower part of the Black Soil on this recently-exposed section. It is that of an Indian Dog, probably of the larger variety. With this evidence it becomes more likely that the dog was indigenous in the culture of New England, and that it was not introduced by the colonists as some students of voyagers' accounts would have us believe.

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A NOTE ON EXTINCT FAUNA AND MAN

In the last issue of AMERICAN ANTIQUITY, Cressman and Laughlin describe probable artifacts in association with mammoths in the Williamette Valley, Oregon.[1] This association reminded me of a queer detail picked up in Puget Sound, Washington.

While giving incidental vocabulary, a Puyallup informant named one too many members of the local cat family: cougar, panther, mountain lion, and a fourth, lion. The Salish term for the latter, he explained, was currently used for the maned lion seen in zoos, etc., but had previously referred to a much larger animal with enormous teeth. In his boyhood, people had told of the ferocious attacks of this cat on children and adults, although actual encounters, he insisted, had ceased "long, long" before.

I have not investigated the true number of cats reported from the section, nor have I traced the habitat of the saber toothed tiger as extending into the area. The above is offered only as an ethnological curiosity which might, at its best, fit into Strong's[2] class of "historical traditions" suggesting extinct fauna.

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ROCK PAINTINGS IN CENTRAL ALASKA

Rock paintings in red pigment were discovered in June, 1940, on a bluff where Moose Creek flows into a slough of the Tanana River, eighteen miles above Fairbanks, Alaska. The find was made by engineers of the Army Flood Control Project after trees and brush had been cleared from the face of the bluff in process of obtaining dam material from the hillside. The paintings, some of them destroyed by weathering, others obscured by lichens, represented human figures in various attitudes, and covered most of a comparatively smooth, slightly underhung rock face approximately twenty feet high and fifty feet long. A smaller group of paintings occurred on a vertical rock face higher on the slope.

The figures ranged from four to twenty-five inches in height. The rough outlines and lack of detail indicates that the pigment had been applied with some loose material such as shavings, with an eye to recording rather than to artistic achievement.

Movement was depicted in the smallest figures by the positions of the arms and legs; in one group the figures all seemed to be marching in one direction. Most open to speculation were two groups, one large and one small, portraying men in boats—boats which, strangely enough, resemble dugout canoes with built-up stern and prow, rather than the birch bark canoes until recently used by the northern Athapascans. The largest single figure, crudely human in form, had short legs, outstretched arms, and a long, beak-like projection on the head.

Trenches were dug along the base of the cliff in search of further traces of the people who made the paintings, but the soil, which apparently has been recently deposited by the river, contained no evidence of an old camp site. An idea of the age of the paintings could be gained only from the presence of lichens over some of them, and the fact that the trees which had grown immediately in front of the cliff were determined by ring count to be approximately seventy years old. The underhang of the cliff, however, as well as the quality of the pigment, suggest the possibility of great age.

Rock paintings have been reported from Kachemak Bay and other localities in the

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[1] Cressman, L. S. and Laughlin, W. S. "A Probable Association of Mammoth and Artifacts in the Willamette Valley, Oregon." AMERICAN ANTIQUITY, Vol. 6, No. 4, 1940.

[2] Strong, W. D. "North American Indian Traditions Suggesting a Knowledge of the Mammoth." *American Anthropologist*, Vol. 36, No. 1, 1934.

present Tanaina area,[1] but apparently these near Fairbanks are the first to be discovered in the Alaskan interior. Unfortunately, the greater part of Moose Creek Bluff was blasted out during the summer, and, with the exception of a pictured rock slab preserved at the University of Alaska, the paintings were destroyed.

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PRELIMINARY REPORT ON A BURIED YUMA SITE IN WYOMING

A new and interesting archaeological site was discovered in the Wyoming Basin, just west of the Continental Divide, by Mr. O. M. Finley of Eden, Wyoming, in 1940. It represents a Yuma camp site associated with bison bones.

In the spring of 1940, Mr. Finley discovered seven stone points or fragments on the surface among sand dunes, about four miles southeast of Eden. They were concentrated in an area about five by twenty meters at the base of a dune, and the presence of decalcified bone led Mr. Finley to the conclusion that they had weathered out of a Yuma site nearby. A slight amount of excavation produced additional points, in place, along with decalcified bison bone fragments. A Folsom point with the tip gone had been picked up by Mr. Finley in a blow-out about six hundred and fifty meters to the north, which added interest to the site.

Realizing its importance, no more excavation was done until Dr. and Mrs. Harold J. Cook of Agate, Nebraska, had accepted an invitation to join Mr. and Mrs. Finley in exploring the site further. Two days digging resulted in the finding of several more points and fragments in situ. Both the points and the bone seemed to be coming exclusively from a stratum of sandy clay about thirty centimeters thick, underlying the dune sand.

It was decided to ask an institution, interested in Early Man, to excavate the site more thoroughly, and Mr. Cook invited Edgar B. Howard to do so on behalf of the University Museum of Philadelphia. Being unable to do this at that time, the Director of the Museum, Mr. Horace H. F. Jayne, sent Linton Satterthwaite, Jr., and Charles Bache of the Museum staff to carry out the work. Mrs. Bache accompanied the party. The preliminary work was done between August 13th and September 7th last. Mr. and Mrs. Finley were of the greatest possible assistance throughout. In addition, Mr. Finley, who is a civil engineer, made and drew up the maps of the site, contributed his thorough knowledge of the topography of Eden valley and its surface archaeology, and was on hand with actual digging nearly every day. Dr. and Mrs. Cook, whose interest in the problem of Early Man has been shown on many occasions, helped generously with advice. They spent several days at the site, discovering two of the artifacts, and locating the first shells.

The site is in Sweetwater County, in southwestern Wyoming. It can be more particularly described as being in the southeast corner of the N.E. ¼ of Section 25, Township 24 N., Range 106 W., which puts it about four and a half miles east of and a little south of the town of Eden, which itself is approximately thirty-seven miles northwest of Rock Springs. The site is reached by car from Eden to Washington Springs, at the edge of a dune area. The elevation is about 6750 feet above sea level. The usual sage brush and rabbit grass constitute the chief flora of the region, and an otherwise uninteresting semi-desert country is relieved by a view to the northeast of the Wind River Mountains. More directly east, low mesas mark a gentle rise to the Continental Divide, twenty-five or thirty miles away. This rise begins about ten miles east of Eden, and along its base is a strip of sand dunes five or six miles wide, the site being a few hundred yards within this

[1] Osgood, Cornelius. *The Ethnography of the Tanaina*. Yale Publictions in Anthropology, No. 16, p. 118; and de Laguna, F. *The Archaeology of Cook Inlet, Alaska*. Philadelphia, 1934, pp. 149 ff.

Rock paintings, Moose Creek Bluff, Alaska. *a*, Moose Creek Bluff, paintings on both sides of tunnel, and on vertical rocks, upper center. *b*, large boat group, covering most of photograph. *c*, portion of cliff. *d–i*, reproductions of tracings made in the field: *d*, height, 25″; *e*, height, 5½″; *f*, width of group, 5½″; *g*, length of group, 17″; *h*, length of group, 11″; *i*, length of group, 31″, see *b*.

Artifacts from Finley Site near Eden, Wyoming. Left to right: A-15, A-19, A-12, A-7, A-17, A-18, A-2, A-1.

dune area. This places the site in the Wyoming Basin, northwest of Baxter Basin, and nearly west of the Leucite Hills. A description of the Wyoming Basin from Fenneman's *Physiography of Western United States* shows that the continuity of the Rocky Mountain System is interrupted by this basin which comprises nearly forty thousand square miles; but, in spite of this topographic separation, the Middle and Southern Rocky Mountains are not independent. They are structurally continuous, with a local sag in altitude. Within this sag, Fenneman points out, the mountains are for the most part buried by younger sediments. The altitude of the plateau surface is between 6500 and 7500 feet, and the basin floor is continuous with the Great Plains through an opening between the Big Horn and Laramie Mountains, and is continuous with the Colorado Plateau by a similar opening east of the Uinta Mountains. The drainage of the Wyoming Basin is one of its most interesting features from a physiographic aspect. The Big Horn River, for example, which gathers the waters of the Shoshone Basin, cuts through the mountains by a canyon over 2000 feet deep instead of taking the easy course eastward over the plains to the Platte River. Many of the streams are intermittent. There are many alkali flats and both sand and silt dunes within the region. The Finley site is about two hundred and fifty miles almost due northwest in an air line from the Lindenmeier site in Colorado.

On driving from Eden to the site, one descends into a broad, very shallow valley and crosses Pacific Draw, which was dry during the time work was carried on there last summer. Dr. Cook agrees with Mr. Finley in believing that Pacific Creek, which originates at the Continental Divide, formerly flowed through this valley. At present, this creek takes a short cut through a young valley to join Little Sandy River, about ten miles to the north. If this stream piracy had not occurred, Pacific Draw would now carry more water than it does, and in humid times this valley would have been drained by a considerable stream. The site is in this shallow valley of Pacific Draw.

Most of the way from Eden the road is very sandy, but before coming to Washington Springs a tough pinkish clay appears in the path and then soon disappears as one descends to the spring. Climbing up to the sand dunes, which are reached just beyond the spring, an outcrop of this clay appears again and runs under the dune. Within the dune area similar outcrops are visible at the surface. Levels taken on the various appearances indicate a gentle slope of the clay down toward Pacific Draw to the west. The clay is now discontinuous, so that the wind has been able to blow out the surface sand in many places to a depth below the bottom of the clay. Presumably, a once continuous deposit of the clay has been subsequently eroded into patches, either by moving water or wind, or both.

The succession of strata at the site is revealed by test pits at approximately five-meter intervals. At the bottom are sands which have a greenish tinge. The grains are rounded and the quartz grains are frosted. The finer sands are at the base and extend to an unknown depth below the water-table. The coarsest sand is at the top of these deposits, just at the contact of the clay layer above. Concretions appear in these sands, being more plentiful near the top where the sand is hard and laminated. Marked, yellow staining occurs at the top of these sands. Above them is a fine indurated sandy clay, pinkish in color, which becomes sandier towards the bottom. Above this clay a definite line of contact appears where a coarse gray, windblown sand has been deposited, and forms the present surface. Animal burrows are scattered through the clay layer, but there is no indication that they extended above the clay layer.

At the site proper, and for the present, most of the artifacts can be regarded as belonging to a Yuma complex. Arranged in a series in Pl. X, they vary from the long, very narrow point, with slight shoulders near the base, and well-defined median ridge, to broader specimens like A-17, in which the flaking has almost obliterated the ridge. Nos. A-18, A-2, and A-1 once had stems, as can be observed in Pl. X, and were probably

DESCRIPTION OF ARTIFACTS

Field No.	Artifact	Material	Position found	Collector	I Blade length†	II Blade width†	III Blade max. thick†	IV % II-I	V Total length†	VI Base length†	VII % III-I	VIII % III-II
A-1	Knife	m.w.* patinated	*In situ* in clay	Finley	47	32	4.5	68	—	—	10	14
A-2	Knife	obsidian	*In situ* in clay	Cook	50	35	6	70	—	—	12	17
A-3	Tip of projectile	m.w.	*In situ* in clay	Finley	fragment							
A-4	Projectile point or knife	m.w.? patinated	*In situ* in clay	Cook	68	20	7	30	81	8.5	10	35
A-5	Projectile point or knife		*In situ* in clay	Finley	62	22	7	35	72	10	11	32
A-6	Tip of projectile	m.w.	Surface	Finley	fragment							
A-7	Projectile point or knife	m.w.	Surface	Finley	68.5	20	6.5	29	81.5	13	10	32
A-8	Knife	m.w.	Surface	Finley	77.5	22	8	28	68	12.5	10	36
A-9	Knife	brown m.w.	Surface	Finley	45	26.6	5	59	—	—	11	17
A-10	Base of point	m.w. patinated partly	Surface	Finley	—	17.5	7	—	—	—	—	40
A-11	Projectile point	m.w. patinated	Surface	Finley	58	16.5	6	28	68	10	10	36
A-12	Projectile point	m.w.	Surface	Finley	82	18	8	25	95	13	10	44
A-13	Tip of point	m.w.?	Surface	Univ. Mus.	fragment							
A-14	Knife	m.w.?	Embedded in clay, upright	Univ. Mus. #40-36-4	69	22.5	7.2	33	82	13	8	20
A-15	Projectile point	m.w.	*In situ* in clay	Univ. Mus. #40-36-1	92	15	7	16	103.5	11.5	8	47
A-16	Base of projectile point or knife	chalcedony or m.w.	*In situ* in clay	Univ. Mus. #40-36-3	62	20	6	32	—	11.5	—	30
A-17	Knife	chalcedony	*In situ* in clay	Univ. Mus. #40-36-5	69	22.5	7.2	33	—	—	10	32
A-18	Knife	dark reddish brown m.w.	Found in excavated material with pink clay adhering. Undoubtedly from clay stratum.	Univ. Mus. #40-36-6	74	28.5	9	39	—	—	12	32
A-19	Base of point	m.w.		Univ. Mus. #40-36-2	90	18	7	20	103	13	8	39

† measurements in millimeters.
* m.w. = mineralized wood.

knives. The material used in making those specimens shown in the plate is mineralized wood, except A-2 which is made of obsidian. The types shown were found in the clay stratum, except nos. A-12 and A-7, which were found on the surface. Three hundred feet north of the site, on the surface, in a blow-out, a Folsom point with the tip broken off, and also a small snub-nosed scraper were found. Five hundred feet north of the site, Mr. Finley also found two stems of the narrower Yuma projectile point, like A-15, and a leaf-shaped knife of quartzite, in addition to several fragments. From higher ground south of the spring, several small leaf shaped points were found and what we might describe as a stemmed scraper-knife with a diagonal edge, similar to others which have turned up in Canada and elsewhere. Twelve to fifteen miles north and west, Mr. Finley found a reworked Yuma point of yellow jasper, and a fragment of another Yuma.

How do these points fit into Miss Wormington's classification?[1] First, we note that, in this preliminary investigation, no oblique type of flaking appears on these specimens. Secondly, we have a type (Nos. A-2 and A-1) which so far seems not to have been found in situ in association with the other types. They might not have been considered a part of the Yuma complex if they had been found on the surface. We must be careful, therefore, to guard against including in the Yuma category every such similar specimen which turns up in widely scattered collections. Even though these from the Finley site were found associated with recognized Yuma points, it will be best to defer expression of a definite opinion until others are found with unbroken stems.

So far as determined, the animal bones are those of bison. About 375 pounds of these bones were removed, the most noticeable thing about them being a certain selectivity. With few exceptions they are those of the lower limbs of the animals, by far the larger part being foot bones, and fragments of the same. Most of the metapodials had been split down the middle and broken off a short distance above the distal ends. A few of the bones showed evidence of burning. A number of bison teeth were also found in place in the clay stratum, as well as a few fragments of jaw bone, but no horn cores nor skulls. There was no mineralization of the bones, but all were decalcified. With such material it has not been possible to determine the species of bison. None of the bones showed any human workmanship, although many were intentionally broken, as already pointed out. A few showed rodent tooth marks.

Invertebrates, from the deposits where the bison bones and the artifacts were recovered, are very small in size and apparently scarce. Dr. Horace G. Richards, of the New Jersey State Museum, who identified the few shells, is unable to throw any light upon the environmental factors involved as the types are all represented in the region today. They include *Gastropoda: Gyraulus parvus* Say, *Succinea avara* Say, *Lymnaea palustris* Müller, *Lymnaea palustris* Müller var; and *Pelecypoda: Sphaerium sp* (very young specimen). Dr. Richards says: "The collection is small and represented, as a whole, by young or broken specimens. Therefore, it is difficult to reach any conclusions about the ecological conditions prevailing at the time the shells were living. With the exception of *Succines avara*, all the species live in fresh water ponds and probably could be found in the same vicinity today. *S. avara* is a land snail, although characteristic of swampy places and is not infrequently found associated with freshwater species in Pleistocene or Post-Pleistocene deposits."

Dr. Paul S. Conger, Research Associate of the Carnegie Institution of Washington, finds no diatoms in the samples submitted to him for analysis. He says: "Silt sediments such as you sent me, when of water origin, often contain no, or only very occasional diatoms, as they represent sediments laid down by highly turbid and muddy streams which

[1] Wormington, Marie. *Ancient Man in North America*, Popular Series, No. 4, Colorado Museum of Natural History.

† measurement in millimeters.
m.w. = mineralized wood.

are not very favorable environments for diatom life. Too, the silting is often so rapid as to greatly obscure the few diatoms that may be present in such a bottom, as the annual increment of diatom sediment is in small proportion to the other. All the samples you sent me also had a high calcium carbonate content, another indication of a possibly unfavorable environment, or perhaps of the subsequent dissolution of the shells."

These are the facts. We hope in the near future that further studies which are being made of both the Yuma and the Folsom problems by the senior author will enable us to present our interpretation of this new Yuma site.

EDGAR B. HOWARD,
LINTON SATTERTHWAITE, Jr.,
and CHARLES BACHE
University Museum
Philadelphia, Pennsylvania

NOTES AND NEWS

We learn that a set of the *Annual Archaeological Reports* of the Province of Ontario, L. K. Cameron, Toronto, printed by order of the Legislative Assembly of Ontario, covering the years 1908–1923, inclusive, has come to light in the possession of Mrs. Morgan H. Stafford, 343 Cabot Street, Newton. Anyone interested in securing this set should communicate with Mrs. Stafford.

NORTHEASTERN AREA

During the first week in April a party of graduate students under Dr. J. O. Brew worked a site, supposedly that of Winslow's house, on property belonging to the Town of Marshfield, Mass. The site was first investigated by Mr. Henry Hornblower, II, who plans to continue excavations during the summer.

Most of the artifacts consisted of nails, glass fragments, and glazed potsherds. Notable finds included two coins of the seventeenth century, a button mold, an iron chisel, four common pins, some drop shot, and a spoon handle.

According to Mr. Maurice Robbins, president of the Massachusetts Archaeological Society, "The Warren King Moorehead Chapter completed a test excavation at a site in Attleboro which we have called the Manchester Field Site. We were interested in this site for two reasons: (1) We have a report that one of the ancestors of the present owner of the site told or wrote of having seen Indians living here as late as 1710 and an old path, now Wigwam Street, was said to have been the path to an Indian village, (2) there are in the Richardson Collection (Attleboro, Massachusetts) a number of artifacts, including two effigy pipes in stone, several bannerstones, pestles and gouges of excellent workmanship from the site, which will be destroyed by proposed construction this summer. The work was carried out by Mr. Bruce Howe, of Harvard University, assisted by several members of our Chapter and some N.Y.A. help. A number of Indian artifacts were recovered, and a small site was definitely located. However, there had been deep and continual ploughing in colonial times over the entire area, railroad construction and highway drainage work, assisted by the removal of gravel for building purposes, had greatly altered the topography and there was evidence that construction camps of 1832 had been located directly over the Indian site. All this had so disturbed the place as to render further archaeological work useless.

"The Chapter will devote the balance of the season to further work at the Faulkner Spring Site. Work was commenced there on May 3 and will continue until late in the fall. We will work in the area west and north of the house site reported in contribution #1 of the Massachusetts Archaeological Society. Increasing evidence of Indian occupation and greater frequency of artifacts per square meter as we progress west and north indicate that we are approaching the heavily occupied area of the site.

"A study of the Richardson Collection of 30,000 artifacts from the Taunton River Basin, the Ten Mile River Basin and Narragansett Bay area will be started this season. It is hoped to make, late in the fall, a statistical and typological report on this collection which is assumed to be typical of the conglomerate culture material from the area.

"The Massachusetts Society will continue work at Nantucket under the direction of Mr. Edward Brooks during the entire season. Work is to be continued on the shell heap which produced several burials last fall and it is hoped to produce a series of contact burials for study next winter.

"Other groups of our Society plan to be busy with the following work:—

"The Sudbury Group plans to continue work under the direction of Dr. Hallam L.

Movius, Jr., at the site on the Concord River which they worked last season; the Holyoke Group will continue their study of the upper Connecticut River cultures under the direction of Mr. William S. Fowler; while the Plymouth Group is planning to continue excavation of the site at Nook Farm which also produced a burial last season."

Dr. Frank G. Speck, University of Pennsylvania, reports as follows:

"During April the graduate-student field research party of the University of Pennsylvania, pursued further investigation on the ethnology of the surviving Virginia Indians. The party divided, working with three groups. Miss Mary Rowell and Henry C. Foreman studied the Pamunkey; Sidney Connor, Morris A. Mook, Robert Solenberger and Theodore Stern worked with the Chickahominy, while F. G. Speck and Edmund Carpenter spent two weeks with the Rappahannock band." (*W. A. R.*)

SOUTHEASTERN AREA

On April 16th Karl Schmitt entered on duty as CCC Senior Foreman Archaeologist at Ocmulgee National Monument.

Excavation during the last three months has been confined to the area around the historic Trading Post where burials are being prepared as field exhibits. Several Creek burials have been found as well as others belonging to earlier occupations. A badly disturbed Mossy Oak burial was also found in the same region. Refuse pits belonging to the Mossy Oak and Macon Plateau periods yielded quite abundant pottery.

Charles H. Fairbanks, Junior Archaeologist, excavated a circular sand mound ascribed to the Swift Creek occupation at Kolomoki Mounds State Park in southwest Georgia. No evidence of burials was found although the mound apparently belonged to the burial mound class. The long low mound of sand near by had apparently been an aboriginal dam as it lay directly across the course of little Kolomoki Creek. This also contained Swift Creek Complicated Stamp pottery. The site has been mapped and the various mounds assigned site numbers. (*C. H. Fairbanks*)

NORTHERN MISSISSIPPI AREA

From Charles R. Keyes of the State Historical Society of Iowa, comes word of the possibility of a season's work in the laboratory in lieu of field work. The procurement of Work Projects Administration assistance in the counties where needed may alter these tentative plans.

The Summer archaeological Session of the University of Michigan will again be at Killarney, Ontario, for eight weeks starting June 25th. Working under the direction of Emerson F. Greenman, the party will carry on exploration of two sites previously partially explored, located above Lake Huron on raised beaches.

In an attempt to complete excavations at the Kincaid site in southern Illinois, the University of Chicago plans to carry out an expanded program for the 1941 field season. Surveying crews under the direction of Roger Willis began work on April 1, and the excavation of one of the large mounds began in early May. W.P.A. and student assistance will be increased in June, and continue through August.

The major projects for the season include: (1) tracing the fortification palisade both north and south of the site, to complete the small sections of the palisade trench already discovered; (2) the sectioning of the long truncate mound with superposed conical, in order to more accurately establish the stages of construction as found in the 1940 test trench; (3) the complete half-sectioning of the flat-topped conical mound at the south-

western corner of the mound plaza; (4) a re-examination of the top and sides of the large truncated pyramid mound in an attempt to determine structural features; (4) the excavation of a large area of village in Pope County, to provide some control data for a possible house structure sequence already indicated by past work. The 6-inch interval contour survey, already completed, has provided new evidence on the areal extent of the site and the conformation of the palisades.

All work in the laboratory in Chicago has been concentrated on the analysis of the Kincaid specimens from all three components (Baumer-Lewis-Kincaid) in preparation for the final report on the excavations. John Bennett, in charge of this activity, expects to have some W.P.A. assistance during the summer. Dendrochronological work, under the direction of Florence Hawley, has been concerned with cross-dating Kincaid with the late Mississippi specimens acquired by Webb and Lewis from eastern Tennessee.

An archaeological expedition jointly sponsored by the Ohio State Museum and the Ohio State University will spend six weeks in the field starting June 23rd. The work is being conducted as a regular course of the first term of the Summer Quarter with a limited group of students making up the field crew. It is planned to excavate a mound located on the west bank of the Scioto River about ten miles north of Chillicothe, Ohio. Headquarters for the field party will be at the Mound City State Park. The expedition will be directed by Richard Morgan and H. Holmes Ellis of the Department of Archaeology, Ohio State Museum.

The Illinois State Museum and the Illinois State Parks Division in cooperation with the Work Projects Administration are planning to excavate a mound and village site that are to be destroyed in process of constructing homes. Miss Harriett Smith of the Museum Extension Project will be in direct charge of the exploration.

The mound and village are almost directly opposite the Great Pyramid of Cahokia. On the map published opposite page 10 in "Cahokia," a bulletin of the University of Illinois by the late Professor Moorehead in 1929, the tumulus is numbered 55. Permission to excavate has been very generously given by Mr. Harry Murdock of Nameoki, Illinois, trustee for the development. It is estimated that work will take six weeks or possibly longer.

Any other archaeological work undertaken by the Museum this season will be in the nature of conserving the record of sites about to be destroyed by commercial, state or federal operations.

The Academy of Science of St. Louis, W.P.A. expedition under the leadership of Mr. Robert McCormick Adams, has two field parties in Eastern Missouri, one located in Jefferson County along the Mississippi River just south of St. Louis, the other located in New Madrid County along sand ridges of the Mississippi River floodplains in the Southeastern tip of the State.

Mr. Paul Munger is the leader of the Jefferson County field party, including twelve men. A few men are continuing work at the extinct animal bone bed near Kimmswick, Mo. The rest of the men are working out house outlines and a mound on a village, the Long component, probably belonging to the Middle Mississippi phase.

Mr. Winslow Walker is in charge of the New Madrid County field party, consisting of twelve men. He is now working on a Middle Mississippi village site of perhaps late date and is uncovering pit houses and extended burials near the houses in a gully area. This site was investigated by the Academy of Science back in 1878 and we hope to obtain valuable comparisons with the work done at that time. This site is described on page 11,

Settlement A, *Contributions to the Archaeology of Missouri* by the St. Louis Academy of Science, George A. Bates, Naturalist's Bureau, Salem, Mass. 1880.

The laboratory staff of five men in St. Louis organizes the materials for publication and display at the Academy's Museum, located at the Adult Study Center of Washington University.

Brewton Berry submits the following:—

The long range research program of the University of Missouri involves the study of the archaeology and ethno-history of the Siouan tribes of Missouri. For the past two years we have been working on the Missouri, locating and excavating some of their villages, we think. A report on this phase of the work has been sent to AMERICAN ANTIQUITY. This summer we are moving into the Osage country. We plan to conduct a surface survey in three or four counties, in which historical evidence locates the Osage villages. Brief reconnaissance work gives us reason to hope that we shall have some success. Then, time permitting, we shall do some excavating at a site that promises to yield some information on the culture of the Osages.

The Indiana Historical Society, with the assistance of the Work Projects Administration, has started upon its third continuous year of the Angel Mound site explorations in Vanderburgh County, Indiana. Activity is centered upon the village site, surrounding palisade and the second largest mound of the group. A laboratory unit, also located on the site, is keeping step with the results of the excavations.

Lloyd Wélford, University of Minnesota, states that: "My plans for the summer are to spend two or three weeks each at four or five village sites in southern Minnesota These sites are Woodland, or possibly sites of a little-known culture tentatively named Cambria, which seems to belong with the Plains Mississippi Phase. One of the sites I propose to study is an historic site of the Sioux Indians. The other Woodland sites belong to an as yet unnamed focus of southern Minnesota." (*G. A. B.*)

SOUTHWESTERN AREA

Dr. Paul Martin reports that he is again going into the Southwest this summer to continue work near Reserve, New Mexico, leaving Chicago about June 10th, and staying in the field three months. Objective is to completely finish digging the SU site, which has already proven so important in helping to identify early Mogollon culture and delineate Mogollon problems.

W. S. Fulton writes that the Amerind Foundation is continuing its work at Tres Alamos on the San Pedro, but without recovering very much material. Excavations in a weathered ball court have met with difficulties, but work will continue until about July 1st, using the rest of the summer to do sherd analysis, restoration, etc. Concerning other work he says, "We have recently completed the excavation of a cave in the Winchester Mountains and have recovered from it a small but quite important amount of material of a ceremonial nature such as miniature bows, arrows, a number of tinder tubes, sherd discs wrapped in bundles of twos, broken painted arrows of normal size, various sandals, and associated sherds of Hohokam, Mimbres Classic, Dragoon, Tucson Ware, and a few from areas to the north."

In New Mexico Dr. Leslie Spier will direct the Chaco Field School during July and August, where excavation will be continued in Chaco Canyon under Paul Reiter and William Mulloy. The plan is to continue work in Tseh So (ruin #Bc 50–51) and some ad-

jacent small sites; roughly Basket Maker III to early Pueblo III. A group of students, under Charles Lange and Ernest Blumenthal, will continue excavation in the Gallina area in pit houses associated with masonry walls, and in a two story masonry ruin. This is a continuation of Dr. Hibben's work in that region.

Dr. C. T. Hurst writes "The report on the 1940 work in Tabeguache Cave, Montrose County, Colorado, will appear in the June, 1941, issue of Southwestern Lore. This cave is a Basket Maker site and appears to represent the culture, in a more-or-less local pattern, from early times to a period transitional to the Basket Maker III period. . . . It is farther east than any yet discovered at its latitude." Work on the cave, which is being done by the Museum of the Western State College of Colorado at Gunnison, will be resumed in August, 1941, and, it is hoped, will be finished this year. Tree ring material is in process of intensive study and gives promise of dates.

E. T. Hall, Jr. writes as follows, "A Columbia University-Laboratory of Anthropology field party will be in camp in the northwestern part of New Mexico during ten weeks of the summer. The program is a continuation of work previously done in the area by the Department of Anthropology of Columbia and the Laboratory.' (*J. C. McG.*)

For the past three years the Arizona State Museum, in cooperation with the Department of Anthropology of the University of Arizona and CCC-ID, has conducted archaeological work on the Papago Indian Reservation. During this time skeleton chronology of the area's prehistory, extending from about 800 to 1400 A. D. has been worked out. In the spring of 1941 significant additions were made to this chronology through the excavation of a large rock shelter which has been named Ventana Cave. A trash deposit of fifteen feet carries the record of man's use of the cave from modern times back through the earliest pottery levels of the Hohokam Culture into the prepottery, pre-agricultural late levels of Sayles' Cochise Culture, and in the lower most consolidated layers of the cave there is Pleistocene fauna which at the present writing does not have certainly identified associated human remains. Unfortunately, the pre-pottery deposit in the cave has been wet at sometime in the past and all organic matter has therefore been destroyed, but the excavations have produced an unusually full complement of stone and bone artifacts.

The upper-most part, bearing trash, is dry and has produced abundant evidence of the perishable materials of the people who made use of the cave. In a total of thirty-five burials there are eight mummies, nearly all wrapped in fur robes, and with limited but interesting burial accompaniments—one adult male wears a wooden nose plug. Sandal types and nose plugs and some other minor traits suggest a very close relationship with the Hohokam. It is hoped that work may be resumed in this cave next year in order to thoroughly understand a story of continuous occupation which will doubtless be more significant in the archaeology of the southern part of Arizona than any other single excavation yet made. (*Emil W. Haury*)

PACIFIC COAST AREA

Arthur Woodward of the Los Angeles Museum writes as follows:

"In March-April 1941, we made another general reconnaissance of sites on the islands of San Clemente, Santa Barbara, Anacapa, Santa Catalina, Santa Rosa and Santa Cruz. John Schrader, formerly a Berkeley student, was on this survey and made a number of kodachrome pictures of terrain and mammals as well as 400 feet of 16 mm. motion pictures of the islands. It is our purpose to integrate all of the phases of island life in order

to understand the former Indian occupation. I believe this is the first time that an attempt has been made to correlate botany, entomology, mammology, ornithology and archaeology on such an island survey. We have done everything from studying insects to stranded tree trunks and practically every study will have a bearing upon our archaeological problems.

"In July, 1940, in Mexico City, I ran across an unpublished diary of Fray Juan Vizcaino who was on board the San Antonio, among the Channel Islands, March-April, 1769, and from it have gleaned several minor bits of ethnological evidence which corroborate our archaeological findings in the Big Dog Cave on San Clemente Island. I hope to have this diary annotated and published this coming season." (*E. W. Gifford*)

Intermittently for several months an archaeological reconnaissance of Round Valley and neighboring valleys in Mendocino County, California, has been conducted by Walter D. Weymouth, Clarence E. Smith, Jr., and A. E. Treganza. To date about three hundred village sites have been located. All of these lie within the territory of the Yukian linguistic stock. (*E. W. G.*)

Mr. Phil C. Orr, Curator of Anthropology, Santa Barbara Museum of Natural History, Santa Barbara, California, has the following to report concerning the activities of his department:

"A short expedition into the Hurricane Deck secured photographs, specimens, and a general survey, for use in future work. The purpose of the trip was primarily to obtain data for the construction of a diorama, which will be shown in the Gould Indian Hall. The diorama is to show the Cave Dwellers of the Hurricane Deck, a region in the interior of Santa Barbara County.

"Field work was also carried out on Mescalitan Island during the past month. There a cemetery was excavated completely. This cemetery will shortly be destroyed by the construction of the new Santa Barbara Airport."

The study of ancient man in the Great Basin has been continued by the Desert Laboratory of the Southwest Museum at Twenty-nine Palms, California. Two large sites are being intensively worked with the hope of placing old cultures in their proper sequence. As different complexes occur on separate levels, a plane table survey is being conducted from which topographic maps will be drawn for publication. At the present writing there is more than a suggestion that a sequence of types may be found and light may be thrown on geological problems in relation to past climatic conditions. Publication of one report is planned for the fall and a second for the end of the year. Field work will progress through May into June or so long as heat waves in the desert basins do not prevent accuracy in the use of surveying instruments. Mapping will be resumed in the fall. Several new sites have come to the attention of the Desert Laboratory and will be surveyed in the near future.

Dr. Ernst Antevs spent considerable time in the field studying geological and climatic conditions and continues to aid and advise in the work. William B. Hatch, Jr., licensed surveyor and graduate engineer of California Institute of Technology, has charge of the surveying and mapping of the projects now under way. (*Elizabeth W. Crozer Campbell, William H. Campbell*)

MIDDLE AMERICA

Dr. A. V. Kidder has kindly supplied the following report of the work of the Carnegie Institution of Washington during the 1940–1941 field season:

Yucatan: Dr. S. G. Morley, with permission of the Mexican Government, investi-

gated the so-called Stela Platform at Uxmal, a low structure scattered over with the fragments of many carved monuments which had been erected upon it. Dr. Morley reassembled, studied and photographed as many of the stelae as possible. All of them had been severely damaged by the repeated burning of the bush during agricultural operations of past years.

Dr. George Brainerd has spent the past year at Chichen Itza and Merida studying and preparing a report upon the large collection of potsherds made during the work of Carnegie Institution at Chichen Itza, Coba, the ruins of the Puuc region, and various other sites in the northern part of the peninsula.

Guatemala: Mr. A. Ledyard Smith has made reconnaissances in the highland region and done preliminary excavations in certain narrow enclosed courts at Kaminaljuyu near Guatemala City which were suspected to be ball courts. This has proved to be the case, and in one of the courts Mr. Smith found placed opposite each other tenoned parrots' heads of stone analogous to those in the Ball Court at Copan.

Mr. R. E. Smith and Dr. A. V. Kidder worked on ceramic collections at the laboratory in Guatemala City, and Dr. Kidder completed surface study of the two hundred odd mounds of the Kaminaljuyu site.

Honduras: Mr. Gustav Stromsvik, assisted by Mr. Robert Burgh, continued the excavations and repairs at Copan which have been carried on in cooperation with the Government of Honduras for a number of years. Major activities were the final clearing and stabilization of the temples flanking the Ball Courts, and repair of the Jaguar Stairway in the East Court. Mr. Burgh mapped the great number of small outlying ruins in the Copan Valley and conducted minor excavations in some of them.

Salvador: Mr. John Dimick, assisted by Mr. Stanley Boggs, continued excavations begun last year at Campana San Andres some thirty kilometers west of San Salvador. The principal mound, situated at the south of a large plaza, has proved to consist of a number of superimposed structures, all of mould-made adobe bricks. Pits and trenches in the plaza have penetrated to a great depth, revealing constructional fills of adobes. Certain minor units of the group have also been investigated. Mr. Boggs is spending the summer in San Salvador studying the large collections of potsherds.

Nicaragua: Mr. Francis B. Richardson, who is making a general study of the stone sculpture of Middle America, went to Nicaragua in the early winter to examine certain newly discovered monuments. This project has temporarily been sidetracked by his rediscovery of the deeply buried volcanic strata containing human footprints which were first brought to notice by Flint in the '70's. With most effective aid provided by President Somosa of Nicaragua, Mr. Richardson was able to uncover a considerable series of these footprints and to assure their preservation *in situ*. Dr. Howel Williams, volcanologist of the University of California, came to Nicaragua at the invitation of Carnegie Institution to examine the deposits concerned. He believes them to be of considerable age.

Dr. Donald D. Brand of the University of New Mexico plans to take a group of advanced students with him and to carry out the following projects from June to August, 1941: (1) excavate a small site on the shores of Lake Chapala; (2) study all the museum collections in the State of Michoacan; (3) continue reconnaissance in southwestern Michoacan; (4) make a reconnaissance through southwestern state of Mexico; (5) excavate one or more sites in the Balsas Valley.

The joint expedition of the National Geographic Society and the Smithsonian Institution, directed by Matthew W. Stirling with the assistance of Dr. Philip Drucker, worked during the winter of 1940–1941 at Cerro de las Mesas on the Rio Blanco in south-

ern Vera Cruz, Mexico. Three widely separated stratigraphic trenches, carried down to a depth of sixteen feet, show that the period of occupation began somewhat later than that at Tres Zapotes, but continued considerably closer to the beginning of the historic period; the stratigraphy at the two sites ties in well.

Fifteen stelae and eight carved monuments were located, the most interesting of the latter being one four feet high which is almost an exact larger duplicate of the Tuxtla Statuette, but without glyphs. Three Initial Series were found, two of them decipherable; these are 9-1-12-14-10 - 1 Oc, and 9-4-18-16-8 - 9 Lamat. As is frequent in this region, only the day-sign is given at the end of the Initial Series.

The most spectacular discovery was an extraordinary offering of 782 carved jade objects of many different types, many of them of most unusual quality. Eight tons of archaeological material, mainly potsherds, were sent to the Mexican National Museum where Dr. Drucker is now pursuing studies upon the ceramics.

Dr. John Longyear spent several of the winter months in archaeological reconnaissance in the Chiriqui region in Panama. Mr. and Mrs. Walter W. Taylor, Jr., have been in northern Mexico in archaeological work under the auspices of the Bureau of Ethnology. Mr. and Mrs. William H. Kelly have been working among the Papagos in northern Mexico. (*J. A. M.*)

SOUTH AMERICA

The School of American Research and the Museum of New Mexico, in cooperation with the University of Southern California and the National Academy of History of Quito, have just ended a six month excavation in Ecuador, under the direction of Edwin N. Ferdon, Jr. The site is near the town of La Libertad on the northern side of the Santa Elena peninsula, and lies on top of the 60-foot high cliffs that mark the shore at that point. The area of the ruin is approximately 2000 feet by 1500 feet and is made up of low undulating hillocks. This region was selected for excavation work because, with the exception of Dorsey's work on the Island of La Plata, there have been no serious scientific excavations conducted on the coast south of Manabi. Further, a potsherd collection previously made by Dr. Jijon y Caamaño indicated the existence in the region of a number of types of pottery not recorded in Ecuadorian archaeology. It was hoped to obtain a stratification that would go far to help determine the true sequences of culture on the southern sea coast and might in the future help in the cross dating of material from coastal Ecuador and coastal Peru. No whole pottery was found, but the main trench produced a wealth of sherd material. The excavation will be resumed in the fall An archaeological survey of Ecuador begun by Ferdon in January, 1940, will be continued.

The Peruvian government has continued its archaeological explorations. Ruins near Lima have been cleared, especially Pachacamac, under the direction of Dr. Luis E. Valcarcel and Dr. Albert Giesecke. Good records of the wall paintings were obtained. Dr. Julio C. Tello has continued work at Pachacamac uncovering excellent ashlar masonry. This is the third coastal site at which dressed stone masonry has recently been found. The other two sites are Tambo Colorado, in Pisco, and a site in Nazca valley. The San Marcos summer session initiated last year will be held again this year from July second to August thirteenth. The study includes trips to important archaeological sites.

The Wenner-Gren scientific expedition has been in the Madre de Dios region for the past year. Recently exploration some twenty kilometers east of Machu Picchu has discovered two cities, two fortresses, Inca roads, terraces, and a stairway about ten feet wide with over four thousand steps leading up to the summit of a mountain behind

Machu Picchu. These ruins indicate that this region was once heavily populated, and not a frontier outpost. Work is continuing.

Two Guggenheim Fellowships were granted to Peruvian anthropologists this year. Mr. J. Eugenio Garro has started work at Chicago on a Quechua linguistic project, and Mr. Jorge C. Muelle has initiated a study of art styles in Peruvian archaeology at Yale. Both Garro and Muelle are from the Museo Nacional in Lima.

Mr. Allan Holmberg of Yale University has reported hundreds of mounds in interior Bolivia. Although engaged in an ethnological study of the Sirionos, he plans to test excavate some of these. Mr. David Stout of Columbia has also investigated shell heap sites in Panama while engaged in a study of the Cuna Indians.

Mrs. Marion Hutchinson Tschopik of the Peabody Museum, Harvard, is excavating sites in the southern Peruvian highlands, including the famous site of Sillustani. Thick Inca levels suggest the possibility of subdivisions which in turn might tie in with traditional Inca history.

Dr. Irving Goldman of Columbia University spent a summer excavating one large tomb and a number of small burial sites in the vicinity of Inza, Department of Cauca, Colombia. The massive stone statues of this region of Tierra Adentro suggest affiliations with San Agustin, but the type of tomb seems limited in distribution. These tombs are large dome-shaped subterranean chambers, entered through a vertical shaft with a spiral stairway. The chamber has a circular floor plan and is divided into seven niches. The walls are decorated with polychrome geometric designs. Pottery types include a tripod vessel, a black-on-red ware, and a coarse mortuary ware with reed-punched applique fillets representing animals. The collection is now at Columbia and the report is being prepared.

The Institute of Andean Research has formulated a tentative plan of archaeological investigation in Latin-America sponsored by the Coordinator's Committee on Commercial and Cultural Relations between the Americas. The South American section up to the moment includes the following projects:

1. Venezuela and the West Indies project under the direction of Dr. Cornelius Osgood, and the supervision of Dr. B. I. Rouse and Mr. George Howard.
2. Colombia project under the direction of Dr. W. C. Bennett and the supervision of Mr. James A. Ford.
3. North Peru and Ecuador project under the direction of Dr. A. L. Kroeber and the supervision of Dr. Theodore McCown and others still to be named.
4. South Peru and North Chile Coast project under the direction of Dr. W. D. Strong and the supervision of Mr. Gordon Willey and Mr. Junius Bird.
5. South Peru and Bolivia highlands project under the direction of Dr. A. Kidder, II, and the supervision of Mr. John Rowe.
6. General Peruvian project under the direction of Dr. S. K. Lothrop and the supervision of Mr. Marshall T. Newmann. The cooperation of Dr. Julio C. Tello and Dr. Luis E. Valcarcel is anticipated in this project's plan. (*W. C. B.*)

BOOK REVIEWS

Early Man in America: Index to Localities and Selected Bibliography. E. H. SELLARDS. (Bulletin of the Geological Society of America, Vol. 51, pp. 373–432. 1940).

The literature dealing with early man in America covers many decades and is both voluminous and scattered. It has been Professor Sellard's intention in compiling this bibliography to make it an index of localities and not merely a list of papers. Thus, known sites for the various states are listed, and the pertinent references given. The material from the sites is briefly discussed, along with the associated faunal remains and geologic conditions. Where possible, the present location of the recovered remains is given. A concluding summary reviews the complete faunal assemblage casting light on man's antiquity. Professor Sellards closes with the opinion—no longer so heretical as when first expressed—that man had reached America prior to the close of the Pleistocene.

Many people who have followed the Folsom discussion in some detail may feel that they are sufficiently acquainted with the literature not to be concerned with a paper of this nature. As a matter of fact, its value to the specialist is just as pronounced as to the student. It is not alone an ample source for the historian of science, but gives a picture of the major trends in a long and important controversy.[1] In addition, the excellent way in which the material has been compressed into skeleton form makes us keenly aware both of uninvestigated areas and poorly recorded discoveries. In the process of cutting out verbiage, the essential facts (or lack of them) are made to stand out, in a number of cases, with increased clarity.

Among the regrettable oversights which abound in the earlier literature particularly, is the failure to indicate or map locations in enough detail to permit of exact examination by following scientists of a later generation. Faunal remains and artifacts have, in some cases, disappeared without description. Many of the earlier papers refer vaguely to "spearpoints" or "arrowheads" without any attempt at further identification. This is tremendously tantalizing at a time when a drawing might reveal affinities to one of our now recognizably ancient cultures and hence have served, in some measure, to remove a nineteenth century find from that list destined always to remain suspect from lack both of preserved remains or adequate description. This is not said in criticism of our scientific predecessors who worked under great handicaps both as to training and monetary support. It is intended, instead, as a reminder that papers still published occasionally show evidence of these errors. Happily, the geologist has now recognized that the archaeologist is interested in the exact nature of ancient artifacts, and the archaeologist, in turn, comprehends the advantages of professional consultation upon paleontological and geological matters. But this co-operation is still worthy of emphasis and extension. Consider, for example, in how few of the listed papers appears any evidence that the problem of the terraces has been reviewed, or attempts made to secure pertinent data in that direction.

Anyone who has ever attempted an extensive bibliography of this nature knows that perfection is simply not attainable. Hence it is not in a spirit of criticism that the reviewer notes the absence of a paper by the great British scientist, Alfred Russel Wallace.[2] Chiefly of interest as an historical item, it, nevertheless, affords a clue as to the fate of the missing Koch collection listed by Sellards as unknown.[3] Worthy of recognition, also,

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[1] The paper may be purchased from the Geological Society of America, 419 West 117th Street, New York City.

[2] "The Antiquity of Man In North America." *Nineteenth Century*, Vol. 22, pp. 667–679, 1887. London.

[3] Wallace (*Ibid.*, p. 670) refers to "the great mastodon skeleton in the British Museum found by Dr. Koch in the Osage Valley, Missouri" with "arrowheads and pottery near it."

is the fine spirit, ever associated with Wallace as a scientist, which is implied in his comment of 1887: "I hold further that it is equally sound doctrine to give some weight to cumulative evidence; since, when a thing is not improbable in itself, it surely adds much to the argument in its favor that facts which tend to prove it come from many different and independent sources, from those who are quite ignorant of the interest that attaches to their discovery, as well as from trained observers who are fully aware of the importance of every additional fact and the weight of each scrap of evidence."[4]

In conclusion we can do no better than to set this serene comment of an earlier day beside the somewhat strident protest of Dr. Hrdlička, who in 1940, still refers contemptuously to the "present Folsom illusion."[5] Though Dr. Wallace was wrong in many of his observations, his may be the victory in the end, as this excellent compilation of Dr. Sellards well reveals. The Folsom problem, nebulous as many of its aspects are, can no longer be dismissed as the monomania of a few obscure westerners. It is a factual reality not to be ignored by the use of mental blinkers. That the problem of man's antiquity has been to this extent clarified, we owe, among others, to the labors of such unlike minds as Dr. Hrdlička's and Dr. Sellards'. Equally, out of doubting and belief, comes the tangible structure of science. It is given to few of us in our lifetimes to know in which attitude our contribution has lain.

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Report of the Durango, Colorado, Public Library Museum Project of the National Youth Administration, 1936–1940. Compiled by HELEN SLOAN DANIELS.

This thick, mimeographed volume summarizes five years of archaeological work under Mrs. Daniels' supervision in the vicinity of Durango. Mainly it was a work of salvage. As Mrs. Daniels explains: "Here we see sites destroyed daily in our attempts to make a modern city. We . . . salvaged what we could with the facilities at hand, compiling a general record of the house forms, skeletal material and tools of early residents of the San Juan Basin. With the newly discovered and constantly refined methods of wood reading we have more material that is definitely dated within this area than can be found in any comparative area in the southwestern United States. Our responsibility remains now to develop in a scientific manner what remains before it also is destroyed in modern progress."

The project was fortunate in having not too large a personnel, ten boys at the most, and a competent field director in Mr. I. F. Flora who, without any training in dendrochronology, has succeeded in dating the abundant late Basketmaker remains of the region. Both he and Mrs. Daniels served without compensation throughout the five years of the project.

The report is a blend of archaeology and administration, with enough archaeology to qualify it under that heading. There are pictographs, typical house plans and good drawings of the principal types of artifacts, including some perishable Basketmaker 2 material from a cave in which Mr. Earl H. Morris of the Carnegie Institution of Washington has recently done further digging.

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[4] *Ibid.*, p. 668.

[5] Review by Aleš Hrdlička of Stanley Casson's *Discovery of Man*, *American Journal of Physical Anthropology*, Vol. 27, p. 168. 1940.

An Analysis of Coastal Algonquian Culture. Regina Flannery. (The Catholic University of America Press, 219 pp., $2.25. Washington, D. C. 1939.)

This is a pioneer distributional study for a large group of tribes within the Eastern Woodlands area. As a reference work, it is a volume which archaeologists and ethnologists dealing with eastern North American material will have frequent occasion to consult.

The main part of the *Analysis* (pp. 1–165) is devoted to consideration of the distribution of 327 traits among the Coastal Algonquian groups (Micmac, Malecite, Abnaki, Pennacook, Massachuset, Mohegan, Metoac, Mahican, Delaware, Nanticoke and Powhatan), and neighboring tribes (Eastern Cree, Montagnais, Huron, Neutrals, Erie, Mohawk, Oneida, Onondaga, Cayuga, Seneca, Susquehannock, Cherokee, Tuscarora and eastern Siouans). Unlike the University of California's survey of western North American culture element distributions, Dr. Flannery's work is based on a survey of the literature, historic, ethnographic, folkloristic, and, to some extent, archaeological, for eastern North America, rather than upon field investigations. Specific citations to sources are given for the occurrence of each trait considered and the probable provenience of each element is discussed. A summary tabulation of the distribution of all traits considered follows the main body of citational material (pp. 166–176). The final section of the study is devoted to an interpretive regrouping of the data (pp. 177–198). Dr. Flannery concludes that the Coastal Algonquian area shows a sufficient amount of homogeneity to warrant its being treated as a cultural unit (p. 196), but that it also exhibits a heavy overlay of elements, chiefly centering around agriculture, which can be traced to Southeastern influence, and another overlay of traits having to do with political organization and war, which can be attributed to influence from the Iroquoian-speaking peoples (p. 190). Internally, the Coastal Algonquian area can be divided into three sub-areas: northern (Northern New England), central (Southern New England, New York, New Jersey, and Delaware), and southern (Virginia-Maryland).

A serious criticism of the *Analysis* concerns the matter of content. Although Dr. Flannery states that her list of elements covers all aspects of Coastal Algonquian culture as completely as the literature allows (pp. 1 and 197), the list of traits for which she gives distributions by no means encompasses all the elements of Coastal Algonquian culture to which references exist in historic or recent sources. A few examples which do not appear in the list are: wooden bowls and ladles,[1] wild plant foods,[2] speaker for chief,[3] relationship system extended to neighboring tribes,[4] burial in extended position,[5] grave covering or house,[6] and the Orpheus myth.[7]

The terminal bibliography of the *Analysis* contains over 600 items and is more com-

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[1] Massachuset, Mahican: MOURT, *A Relation or Journall of the Beginning and Proceedings of the English Plantation Settled at Plimoth in New England*, London, 1622, p. 18; ALANSON SKINNER, *Notes on Mahican Ethnology*, Public Museum of Milwaukee, Bulletin 2, pp. 93–95, Pl. 25; and *Indians of Manhattan Island and Vicinity*, American Museum of Natural History, Guide Leaflet 41, New York, 1932.

[2] The only traits covered in the *Analysis* which have to do with the use of wild plants as food are "maple sugar" (trait 35), and "seasoning with vegetable oil" (trait 37).

[3] EDWARD M. RUTTENBER, *History of the Indian Tribes of Hudson's River*, Albany, 1872: quoted in *Bureau of American Ethnology*, Bulletin 30, Pt. 1, p. 787.

[4] Abnaki, Delaware: FRANK G. SPECK, *A Study of the Delaware Indian Big House Ceremony*, Publications of the Pennsylvania Historical Committee, Harrisburg, 1931, pp. 30–33; and *Oklahoma Delaware Ceremonies, Feasts and Dances*, Memoirs of the American Philosophical Society, Vol. 7, pp. 111–117, Philadelphia, 1937.

[5] Delaware, Seneca: JOHN MCCULLOUGH, "Narrative," pp. 110–111, in J. PRITTS, *Incidents of Border Life*, Lancaster, 1839; BERNHARD J. STERN, "The letters of Asher Wright to Lewis Henry Morgan," in *American Anthropologist*, n.s. 35, 1933, p. 144.

[6] Massachuset, Delaware: MOURT, *idem.*; and FRANK G. SPECK, *Oklahoma Delaware Ceremonies, Feasts and Dances*, p. 121.

[7] Malecite, Micmac, Seneca, Huron, Cherokee: A. H. GAYTON, "The Orpheus Myth in North America," *Journal of American Folklore*, Vol. 48, 1935, p. 266.

plete, both as regards source references and modern accounts, than any bibliography heretofore published for the eastern tribes. Certain pertinent items are, however, missing, as for example:—RICHARD CALMIT ADAMS, "Notes on Delaware Indians" (*Report on Indians Taxed and Indians not Taxed, U. S. Census 1890*, pp. 297–300); CHARLES THOMSON, *An Enquiry into the Cause of the Alienation of the Delaware and Shawanese Indians from the British Interests, Together with the Remarkable Journal of Christian Frederick Post* (London, 1759); STERN, "The letters of Asher Wright to Lewis Henry Morgan" (*op. cit.*); RUTTENBER, *History of the Indian Tribes of Hudson's River* (*op. cit.*); MOURT, *A Relation or Journall* (*op. cit.*). By an unfortunate oversight, the titles for some of the references cited in the main part of the *Analysis* are also omitted from the terminal bibliography; examples of such omissions are "Ganong, 206" (referred to on p. 6, *Analysis*) and "Lloyd, *Scandinavian Adventures* I, 204" (referred to in *n.* 6).

Another defect in editorship appears in the summary tabulation of trait distributions. The entries on this table do not always coincide with the more detailed presentation of trait distributions given in the main part of the study. For instance, in the main section under trait 23, "spearing of fish," a reference is given to the occurrence of this trait among the Huron (p. 18), but in the summary table there is no plus entry for the trait in the Huron column. Similarly for trait 30, "dumbbell pestle," one citation is given in the main section for the Mahican, and seven citations for the Iroquois occurrence of this pestle, but in the summary table plus entries are lacking for trait 30 in the "New York area" column and in the Iroquois column.

The thousands of citations to sources for the occurrence of the 327 traits considered have been admirably handled. A check, in part, of the citations for traits 224–236 inclusive revealed no errors and indicates that references have been verified by Dr. Flannery with scholarly carefulness.

Although the *Analysis* is not exhaustive, it nevertheless offers, for the first time, a generous amount and wide variety of comparative data for an area in which the assembling of such material is a time-consuming, specialist task. In one sense a token of Dr. Flannery's and Dr. John M. Cooper's work on an ethnological survey covering all of eastern North America, the *Analysis* makes evident the heavy debt anthropologists will be under when the total results of this survey are published.

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The Taft's Point Shell Mound at West Gouldsboro, Maine. W. S. HADLOCK. (The Robert Abbe Museum, Bulletin 5. Bar Harbor, Maine, 1939.)

The Abbe Museum, by publishing an account of the excavation of a large shell heap, has added an important number to its series of Bulletins and to the literature of the Northeast. The shell heap, located on the southern shore of Jone's Cove, might be classified as one of the larger ones on the coast and certainly it belongs among those characterized by a deep deposit. The deposit was stratified, but because of various conditions coincident with its development the stratification was complicated almost beyond comprehension. The author identifies an upper layer of sod and grass roots, underlayed by "wide bands of whole and broken shells separated by horizons of ashes, charcoal, beach gravel and camp dirt of black humus." Beneath this there was a layer of black humus which extended over the entire portion of the shell mound. This black humus rested upon "yellow and red sand, sometimes mixed with small deposits of clay . . . The lower horizon was made up of fire pits, many of which were stoned, forming basin-like indentations . . . other fire pits showed no traces of having been stoned on the bottoms or outer edges." The pits were filled with ashes and charcoal and showed evidence of intense heat. An interesting note is that several of the hearths had been used during the entire time it took to build the heap.

The list of stone artifacts includes tools which are characteristic of such shell heaps. In addition, the discovery of slate points of the type formerly called "bayonet points" is most interesting. These specialized tools were found in greatest number "next to the sand at the bottom of the lowest horizon; three others were from the upper portions of this band where it was mixed with shells, and one which had been worked down from a larger lance that had been broken, was located in a two inch horizon of black ash fourteen inches down from the top of the sod." Interestingly enough, adze blades were uncommon in the lowest horizon and more common in the upper layers of shell, fire dirt and grass roots. The greatest number of celts came from the upper portions of the shells.

Of the bone work, bodkins were characteristic of the upper layers as were also needles and awls. Two very large projectile points made from the sword of the swordfish were taken from the lowest horizons. A great variety of harpoons were discovered, they were "evenly distributed throughout the various levels of the mound." The larger types occurred more often in the lower horizons but were occasionally found in the grass roots. The smaller ones were very rarely found in the lowest band of black humus but were usually found in the upper layers of the shells about the outer edges of the fireplaces. Flakers found throughout the various horizons, and sharpened beaver teeth from all levels, complete the list.

A single, flexed burial covered with red ochre, but including no grave goods, was discovered at the very bottom of the shell heap. No grave shaft was identifiable but a stone platform lay nine inches above the skeleton. The author believes that since the stones of the platform "had not been disturbed," the burial was made by the first inhabitants of the heap. It is equally possible that if, as the author suggests, the stone platform was a part of a house floor the burial may have been associated with it. We know that Indians in the northeast frequently buried their dead beneath the fireplaces in their houses.

Pottery was not found in the lowest level of black humus, being found only in the upper levels of shells, camp dirt, and fire dirt. Pottery from the lower horizons was much thicker and has less decoration than that of the upper. Apparently, most of the pots were of the pointed-bottom, or some related type. An exception was a section of a rim from the grass roots which was decorated with an "Iroquoian pattern," the assumption being that the bottom was round. Decoration on the potsherds seemed to be more common in the upper horizons than in the lower. A variety of techniques and designs are described, all of them common to the region. But one example of "corded" decoration was noted. "By comparing these potsherds with collections and illustrations of archaeologists, we found pottery of the archaic Algonkin in the lowest pottery horizon, and later Algonkin, some of which showed Iroquoian influence, in the upper horizons."

In a short summary, the author compares the material from the lower horizons with that from the overlying deposits, pointing out that, in spite of the occurrence of certain types of tools in varying concentrations in all levels, certain others, slate points for example, were found only in the lower level. By implication, we find the lower horizon characterized, in particular, by slate points and straight stemmed arrow points. The horizons above this are characterized by notched arrow points and two types of pottery —late Algonkin, followed by highly decorated Algonkin pottery and some which showed Iroquoian influence. In other words, there is a suggestion that the primary culture was succeeded by a culture which included a different assortment of traits. This succeeding culture was, in the end, modified through the arrival of new ideas.

This paper is difficult to read in some places and thus important facts are partially obscured. This difficulty is due mainly to the complications in the heap which militate against a clear presentation. Be this as it may, the facts presented by Mr. Hadlock are

extremely important and interesting. The description of the confused deposits adds to existing data which we hope will soon be complete enough to permit a determination of a reason for them. Furthermore, in identifying changes in culture content, the author has demonstrated a sequence of cultural developments at this site. To prove that such developments have taken place is certainly furthering archaeological work in the region.

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The Viking and the Red Man, the Old Norse Origin of the Algonquin Language. REIDER T. SHERWIN. (pp. xxvi+340. $2.50. New York and London: Funk and Wagnalls Co., 1940.)

This book attempts to demonstrate an "affinity between the Algonquin language and Old Norse." The author is not altogether clear as to whether he is trying to demonstrate a common genetic origin or a process of contact-modification and borrowing.

The former thesis is beyond the realm of logical possibility, since it would require the absolute demonstration that all of the thirty some, highly differentiated, Algonquian languages were derived from Old Norse in a period of about five to six centuries. There is nothing to indicate such a rapid rate of linguistic change in any American language. The earliest vocabularies of Micmac (Lescarbot, 1609), Penobscot or Abnaki (Weymouth, 1605), and Delaware (De Laet, 1633) reveal no essential divergencies from the same languages still spoken today, nearly three and a half centuries later.

The latter hypothesis, if we define it as slight borrowing during a relatively short period of contact, is not entirely beyond possibility. If we accept the Icelandic sagas and *Flatey Book* as semi-historical documents, Leif Ericsson landed somewhere on the American shore about the year 1000. In the years following, Norse expeditions headed by Thorvald Ericsson, Thorfinn Karlsefni, and Freydis Ericsson, respectively, arrived in Vinland and Markland. Thorfinn and his followers were the only ones to make a serious attempt at colonization, apparently somewhere in Nova Scotia. Most of the Viking contact with the aborigines or "skrelings" was hostile, a factor which did not favor linguistic borrowing. Also, it would seem that the natives whom the Norsemen met were more probably Eskimo or Beothuk than Algonquins. Subsequent voyages from Greenland to America were undertaken by Bishop Eric Uppsi in 1121 and Bishop Arnald in 1134. The last voyage mentioned in the sagas occurred in 1347, after that there is no record of further contact.

The volume is replete with naive attempts to demonstrate linguistic relationships between Old Norse and various Algonquian languages. Consideration of historical chronology and reconstruction, as well as systematic sound correspondences, are disregarded for a type of method which might be called "letter tyro-philology."

Penobscot *sèk ɔso*, he is afraid (p. 56), can be shown to be derived from Proto-Algonquian **säkesiwa*,[1] and has a history which is distinct from Old Norse *sik gyse*, to fear.

[1] See L. BLOOMFIELD, "On the Sound-System of Central Algonquian," *Language*, Vol. 1, p. 130, 1925, for an excellent example of both the historical method in linguistics and the fundamentals of Algonquian reconstruction.

Penobscot or Abnaki terms are given in my own phonemic transcription based on field work done in Maine from 1932–39. The asterisk (*) marks forms reconstructed by the historical technique.

<, "is derived from"
ON, Old Norse
IE, Indo-European
PA, Proto-Algonquian

Massachusetts *masq*, bear (p. 84), and Delaware *maxkw* < PA **maxkwa*, bear, and cannot possibly have any connection with Norwegian *morsk*, grim, fierce. Massachusetts *ohke*, land, Penobscot *kki*, *-ahki*, and Ojibwa *ahki* < PA **axkyi*, land, and have no historical relationship with ON *akr*, field, or ON *hagi*, pasture land (pp. 8, 58, 284). On the other hand ON *akr* < IE **agros*, field, as do Latin *ager* and modern English *acre*. With such linguistic methods one might as well derive Cree *aski* or Blackfoot *ksáxkum*, land, from ancient Gothic *akrs*, and say that the Goths in their numerous migrations wandered into the northern Rocky Mountains. The first two come from the same Proto-Algonquian term, and the third from the same Indo-European parent-word. Penobscot *nčnehse*, I breathe (p. 114), < PA **nilāhlă*, and is unrelated to ON *mi noesa*, I breathe, < ON *noes*, nostril, which in turn is derived from the Indo-European prototype of Sanskrit *nas* and Latin *nāsus*, nose. Micmac *pi·sew*, foam (p. 157), < Cree *pīstēw* < PA **pē?tăwi*, foam, and not from ON *bysja*, to gush.

Any two unrelated languages frequently show a few or several purely fortuitous correspondences. Some may be noted here: Mass. *adtonkqs*, kinsman, ON *aatungs* (p. 4); Mass. *ahanu*, he laughs, ON *ahaana*, to snicker (p. 7); Micmac *ap*, again, ON *apt* (p.17); and Cree *nipit*, my tooth, Penobscot *nipit*, my tooth, *nipital*, my teeth, ON *mi bit*, my tooth, *me bitar*, my teeth (< ON *bīta*, bite) (pp. 88, 101, 123). In every case when the etymological history of each word is investigated such chance similarities are found to be deceptive. In other words, each word has its own history and mere superficial "letter" similarity does not imply historical, sound correspondence which operates according to systematic phonetic laws. And so on through the entire volume!

Many other criticisms could be made but this will suffice. To sum up, not a single one of Sherwin's Algonquian-Norse "cognates" are convincing. Many are ridiculous and the remainder, although they may seem plausible to the layman, are demonstrably false. Loan-words, even from the languages of other American stocks, are relatively rare in all Algonquian dialects. There is no evidence that the Vikings had any considerable contact with any Algonquian group either on ethnological or linguistic grounds. In all probability the Norsemen did reach the North American continent at an early date, but their cultural and linguistic influence was slight indeed.

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Anthropometric Observations on the Eskimos and Indians of Labrador. T. DALE STEWART. Material and data collected by WILLIAM DUNCAN STRONG. (Anthropological Series, Field Museum of Natural History, Vol. 31, No. 1. 163 pp., 1 map, 16 plates. $1.75. Chicago, 1939.)

Dr. Stewart's paper is partly a presentation of new material, and partly a painstaking consideration of the reliability of the whole body of physical data on the Eskimo, new and old. Strong, in 1927 and 1928, measured a good sized sample of Labrador Eskimos (58 males and 79 females) as well as a handful of Montagnais-Naskapi Indians, and collected a number of Eskimo skulls and skeletons, partly from nineteenth century Christian graves and partly from "Old Stone Graves" of pagans of the eighteenth century or earlier. To supplement the latter group, Dr. Stewart measured, or obtained measurements of, other skulls of the same character, notably the collection in the Peabody Museum, thus furnishing himself for comparative purposes with a total series of "Old Stone Graves" crania of more than thirty of each sex. All statistical constants are given, the raw data are presented in tabular form as an appendix, and a number of plates illustrate both the living individuals and the crania.

Stewart finds the old Labrador skulls to be most nearly like the Greenland crania,

the differences being more in the small size of the Labrador measurements than in any indicial expressions of shape. They are somewhat less like the Old Igloo (which is Birnirk, at present writing) and the Thule series, and Stewart, therefore, believes that this Labrador population does not represent survivors of a Thule strain, supposing that this was once present. Whether it is connected with the Dorset culture or immigration cannot be known until the Dorset physical type is discovered. A point of possible interest in this general connection may be mentioned with regard to Stewart's discussion of the living. In comparing his own series with others, he finds the eastern Arctic homogeneous in type excepting for a small sample from the Smith Sound region of northwest Greenland, where the face and head are unusually broad. Now, Shapiro noticed that these differences for the Smith Sound region were even more marked in the crania, and the same thing is to be seen in Stewart's own "Thule" series, which probably includes the crania Shapiro was quoting. Since this area was apparently recently Thule territory, there is, thus, a conformity in this special case of physical type and culture, if the probability is accepted that a broad head and face were characteristic of the Thule people.

The nineteenth century "Recent Graves" skulls are too few to be trustworthy, but they give some indications that the Labrador type changed with white contact, apparently becoming more round-headed and narrower and longer in the face. These same indications are to be found in the measurements on the living, which leads Stewart to the logical generalization that altered diet has modified the eastern Eskimo type to the point where it is unsafe to refer to its present form in studies of Eskimo racial history. There are other grave deficiencies in recent material, and Stewart is unwilling to give much significance to the figures he is presenting. The Eskimos are lighter in skin color than the Indians, but they are difficult to distinguish from them in measurements; this applies to the northern bands, who perhaps differ somewhat from the more southern ones.

Not only is Stewart chary of drawing conclusions himself; he also makes gestures toward undoing some of the conclusions of previous writers, regarding with a general suspicion the identification of Eskimo types with Cree and Chipewyan groups which are far removed in locale, different in stature, and much exposed, like the Eskimo themselves, to white contact. He notes, however, that it is difficult to find any such approximation to the Eskimos among Indians anywhere, and that these investigations have therefore been very worthwhile. But it does appear to the reviewer that they have tended not only to give the impression of a Canada full of Eskimo-like Indians, but also to gloss over the significance of the distinctively Eskimo skull type and external appearance which, in spite of their familiarity, elude description in comparisons of measurement lists. This type is of course not universal in the Eskimos, but it is surely more general than seems to be assumed in theories of wholesale migrations of Indians to the Arctic coast. On the other side, only Shapiro and Morant have pointed out definite likenesses between some of the Eskimo and certain of the very "Mongoloid" Siberians, Morant in particular picking out the Chuckchi with the CRL.

Actually, Stewart's main concern is with the weakness of the data. He gives full expression to the troubles of mind that beset most physical anthropologists today, relative to faulty techniques of measuring, differences in defining measurements, disagreements in assigning sex to crania, and difficulties in detecting mixed bloods among the living. All this is aside from the effects of white contact in other forms, and the lack of archaeological identification of many Eskimo skulls. This is why he would question previous hypotheses, and would clearly like to abate the desire to draw historical inferences from the existing data, and why he deplores any such uncritical device as the Coefficient of Racial Likeness, which inevitably gathers all the above sources of error together. Coming from a long time student of the Eskimo, and one who is particularly interested in

the correlation of archaeology and physical anthropology, these sentiments must have a sobering effect on other students of the Eskimo problem. We can only hope that he is unduly pessimistic. Nevertheless, what he says about anthropometric techniques is very true, quite apart from the Eskimos, and he has not stressed it too far by any means. Stewart is satisfied, for example, that some of the measurements made by Strong, who had had no previous experience in anthropometry, were wrongly taken, but he has reason to suspect that the material of other workers is equally faulty. I cannot forbear quoting gratefully, what Strong says in a prefatory note regarding such errors, after his own experience: "In part they are personal, in part due to defects in training. Since I am deeply convinced of the basic necessity of the combined biological and cultural approach in anthropology, this lack of training and practice in anthropometry is significant. Until all our university departments in anthropology offer adequate opportunities for, and enforce, such training, penetrating biological and cultural correlations will rarely be made by anthropologists. That a field ethnologist among a willing people should fail to record biometric data seems absurd. Yet so long as the field ethnologist or archaeologist lacks the necessary training and practice in this regard the results of such work must always be suspect."

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SOME RECENT PUBLICATIONS

UPPER NORTH AMERICA

Adams, R. M., Frank Magre and Paul Munger, "Archaeological Surface Survey of Ste. Genevieve County, Mo." (*Missouri Archaeologist* 7, No. 1. p. 9, 3 pls., 10 figs., map).

Amsden, Charles, "Arts and Crafts of the Southwestern Indians" (*Masterkey* 15, No. 3. pp. 74–80. Los Angeles: Southwest Museum, 1941).

Baldwin, Gordon C., "Survey of Southwestern Prehistory" (*The Kiva* 6, No. 8. pp. 29–32. Tucson: Arizona State Museum).

Brownlee, Fred L. and Charles S. Johnson, *The Indians of North and South Dakota* (51 pp. Fisk University, 1941).

Bushnell, David I., Jr., "Trailing Early Man in Virginia" (*Explorations and Field-work of the Smithsonian Institution in 1940*. pp. 75–78, illus. Washington, 1941).

Campbell, T. N., Ben R. Howard, Claude C. Albritton, Jr., and Dodd N. Osburn, "Petroglyphs as Criteria for Slope Stability" (*Science*, April 25, 1941. Vol. 93. No. 2417. p. 400).

Cassell, Raymond K., "A Postulated Corridor of Folsom Migration" (*Papers of the Michigan Academy of Science, Arts, and Letters* 24. pp. 451–457, 3 figs. Ann Arbor, 1941).

Chapin, Gretchen, "A Navajo Myth from the Chaco Canyon" (*New Mexico Anthropologist* 4, No. 4. pp. 61–63. Albuquerque: University of New Mexico, 1940).

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